The Chemical Age

A Weekly Journal Devoted to Industrial and Engineering Chemistry

VOL. XI. No. 269 AUGUST 9, 1924

Prepaid Annual Subscription: United Kingdom, £1.1.0; Abroad, £1.6.0.

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NOTICES.—All communications relating to editorial matter should be addressed to the Editor, who will be pleased to consider articles or contributions dealing with modern chemical developments or suggestions bearing upon the advancement of the chemical industry in this country. Communications relating to advertisements or general matters should be addressed to the Manager.

The prepaid subscription to THE CHEMICAL AGE *is 21s. per annum for the United Kingdom, and 26s. abroad. Cheques, Money Orders and Postal Orders should be made payable to Benn Brothers, Ltd.*

Editorial and General Offices—8, *Bouverie St., London, E.C.4.*
Telegrams: "Allangas, Fleet, London." Telephone: City 9852 (6 lines).

Hard Facts and Research Workers

WE were discussing with a well-known research chemist a day or two back the difficult and frequently debated problem of the extent to which a research chemist's salary can be made commensurate with his value to his employer. The question is, of course, not by any means so simple as that of the workman and his wages, and one might consider, for example, a group of a dozen chemists engaged under a director of research. All may be equally experienced and have attained about the same standard of excellence in work, but since the researches put into their charge must vary in difficulty of execution, in originality of conception, and certainly in value when successfully completed, the results give little guide as to the relative salaries the chemists are worth. Moreover, since each chemist has an opportunity of learning from, and profiting by, the previous researches of his colleagues, whatever successes are achieved should properly be placed to the credit of the department and not to that of the individual. It would appear fair, therefore, to pay a uniform standard salary to every chemist in the department, and, if some great success eventuates, to divide equally among them any special reward which seemed appropriate.

Such a scheme has, however, a fatal disadvantage in that it kills individual competition. Few of our chemists have yet attained to such perfection of altruism that they will put forth their supreme efforts for the common good, and it would seem essential that some form of personal reward for good service should be included in the scheme. Glory, which in the circumstances is necessarily limited to the narrow circle of the department itself, is usually insufficient; and a sense of personal satisfaction with "something attempted, something done," though it may have consoled the village blacksmith, will not provide us with the necessaries of life in these hard times.

In some cases the difficulty has been partly solved by making a series of "bars" in the salary scale, each of which can only be passed when the chemist shows merit above the average. As we have said, the successful carrying out of a piece of research is no help in deciding merit. The director of research can usually arrive at a fair estimate of a chemist's value whether an investigation be successful or not. Fertility of resource, originality of ideas, chemical intuition, capacity for appreciating the relative importance of discoveries made, even ability to compose a properly balanced report—all these should be taken into account in deciding whether a chemist shall pass the "bar" or not.

It is difficult, if not impossible, to define exactly to what extent a research chemist's brain becomes the property of his employer. Any ideas he conceives and any results he obtains as a direct consequence of his employment, must belong of course to his employer, but a too narrow interpretation of this rule acts to the detriment of both. The salary he gets is conditioned less by his own merit, provided that be above the average, than by the number of chemists of average merit who at the moment may be unemployed. The tendency must surely, therefore, be for him to limit his output of ideas to the minimum which will keep him just above the average, *i.e.*, which will enable him to retain his post. If, on the other hand, exceptional merit brought with it pecuniary recognition, an incentive would be provided for the full exercise of all his powers, and both employee and employer would reap the benefit. The position is a curious one. There is no profession in which real team-work in the best sense of the word is more essential, and at the same time the research chemist is before all—as it was put to us—an individualist whose best efforts can only be called forth by the offer of suitable rewards.

The Claude Process

INFORMATION regarding the success of the Claude process of synthesising ammonia has been somewhat lacking of late, and as the method has appealed to the imagination of chemical engineers owing to the enormous pressures desirable on purely theoretical

grounds having been used in practice, the appearance of an article in *Chimie et Industrie*, by M. Georges Claude, describing the results obtained to date is particularly welcome. The article is really a reproduction of an address by the author at the Italian Congress of Industrial Chemistry at Milan last April, and the evolution of the practical process from its theoretical concepts is clearly described, the chief points, which are well known, being that the yield is better at the high pressures of 1,000 atmospheres, the apparatus smaller and not nearly so difficult to render gas-tight as would be expected, the heat changes more favourable, and so on. The principal difficulty arose with the bursting of the early catalyst bombs, which were made of thick metal, the rupture being shown to be caused by the thermal expansion of the inner layers, and the comparatively bad conductivity of the metal. This led to the idea of warming the outside of the catalysing vessel by the incoming gases which completely overcame the difficulty. The facts have, of course, been described before, notably in THE CHEMICAL AGE, July 17, 1920, and May 10, 1924, but the present account is full of interest when read in the original French, particularly as it is written in an entertaining style, which the following quotation describing the early experiments clearly indicates. The author says: "Cela marchait trés bien quand, en poussant le debit, une tuile nous tombe. Un premier tube éclate. Diable! Puis un second, puis un troisieme: cette fois, c'est la désastre. Il faut au moins tâcher de comprendre pour essayer d'en sortir."

The greatest interest, however, is in the list of works now employing the Claude process. The original plants at Montereau and Béthune had capacities of 5 and 3 tons of ammonia daily, now there is a 20-ton plant at Béthune, at Aniche 15 tons, at Decazeville and Saint-Etienne plants of 5 tons each, and these are to be increased to 50 tons each at Béthune and Aniche, and 20 tons at Saint-Etienne. In Belgium there is now a 60-ton plant at Ougrée-Marihaye, a 15-ton installation in Spain at Felguera, and factories capable of producing 5 tons daily are in operation in Switzerland, Italy and Japan. These figures clearly indicate that the Claude synthetic ammonia process is now a firmly established contribution to the nitrogen fixation problem.

The Toronto Meeting

AT the moment there is little information of the actual progress of the British Association meeting at Toronto, which opened this week, but by the time these lines are read the meeting will be half over. The president this year is Major-General Sir David Bruce, K.C.B., F.R.S., who was formally installed on Wednesday by the retiring president, Sir Ernest Rutherford. It only happens at intervals that the president is a chemist, and this having been the case last year at Liverpool, the choice has fallen upon an eminent medical man on this occasion. Sir David Bruce's address dealt with the subject of "The Prevention of Disease," and consisted of an interesting review of the work in this field since the time of Louis Pasteur's discovery of the nature of putrefaction. Consideration of the various discoveries in the inoculative treatment of various diseases formed the greater part of the address, but due attention was given to the influence of the discovery of vitamins by Professor Gowland Hopkins in 1912, in the prevention of the deficiency diseases.

The president of the Chemistry Section this year is Sir Robert Robertson, the Government Chemist, and his address on "Chemistry and the State," which is summarised elsewhere in this number, records how the Government in this country has gradually come to recognise its chemical obligations to the public, not only in the preparation of the best war material possible, but also in such matters as the development of agriculture and the production of pure food.

One of the features of the meeting this year is the scale on which the various diversions—social and educational—have been organised. There are to be the usual receptions, garden parties, musical recitals, etc., arranged by the University authorities, and also a visit to Niagara Falls, when some of the hydro-electric power stations will be inspected. After the meetings many of the delegates will make a trip across Canada to Vancouver in special trains, and on the way a call will be made at Saskatchewan, when the Chemical Section will hold a meeting to inaugurate a new chemical laboratory in the University there. Among the other places to be visited in this transcontinental trip is Sudbury, where the greater part of the world's nickel is mined, and where the well-known Mond nickel carbonyl extraction process is in operation. Delegates will thus be able to form a representative impression of Canada and its chemical development which cannot fail to be lasting when presented in such a manner.

What is a "Born Chemist"?

A CORRESPONDENT who evidently has a predilection for conundrums, and who is not yet satisfied that a really convincing answer has been given to that much-discussed question: "What is a Chemical Engineer?" asks us, by way of a change, if we can assist him in arriving at a solution of an expression which is so glibly made use of, and tell him what are the particular qualifications which go to make a "born chemist." To the best of our knowledge the prefix is not exclusively applied to chemists, and its precise meaning varies in accordance with the particular impression it is desired to convey. One might hazard the suggestion, however, that the mark of the great chemist is his ability to forecast intuitively the course of a chemical reaction, and, since the properties of a substance are largely a function of its reactions, to describe the properties of a compound from its formula. But how is this valuable faculty to be acquired? The psychologist tells us that intuition proceeds from subconscious memory. The inner mind, by a process of cerebration exactly analogous to the conscious deduction of conclusions from ordinarily remembered facts, draws its conclusions from memories buried beneath the surface, and the final result comes to light as an "intuition." In support of this view there are examples, with which every chemist has met in his own experience, where a *half*-remembered fact determines the statement of an opinion for which it is impossible at the moment to assign a definite reason.

" I'm sure I've seen somewhere," he says, " that the reaction fails with such compounds, but I cannot remember exactly where." This is the half-way case, and we might call it " semi-intuition."

However that may be, it gives the clue to the method by which " chemical intuition " may be acquired. It is not " born in " a man, but is the result of the stocking of his memory, conscious and subconscious, with chemical facts and experiences. This can be done by assiduously reading appropriate literature. Naturally the degree of success to be expected will vary greatly according to the type of mind with which a man is endowed, and as this is a matter of heredity there is certainly some meaning to be attached to the phrase a " born chemist." But it will be agreed that a " born chemist " might equally well have become a born physicist or a born scientist in any other branch demanding a similar type of brain or memory. Upon most people the reading of a scientific paper produces less impression than writing it down—probably because the " pictorial memory " is the most common. The recipe for the acquisition of a chemical intuition should, therefore, include not only the reading of chemical literature but also its transcription in the form of notes. This has the added advantage that forgotten or half-remembered facts can be looked up in the notes and so reimpressed upon the memory.

It is obvious that no man can hope to acquire a useful intuition in more than a limited section of the subject. He must be content to specialise. With the help of a good library he may in the course of five or six years, if his reading has been well-chosen and constantly pursued, become an authority in dyestuff chemistry, in the chemistry of soaps or of perfumes or in any other selected branch. The employer should bear this in mind when he has to choose amongst rival candidates for chemical appointment. He naturally prefers the " born chemist," but this is merely a label indicating the possession of a certain type of mind and a certain brain-capacity. The " intuition " upon which the real value of the man depends is not born in him, but is developed by his own labours and experience. Having said so much we must leave it to those of our readers who believe themselves to be " born chemists " to develop the argument further.

Sir George Beilby

THE sudden death of Sir George Beilby towards the end of last week must have come as a painful shock not only to those who were fortunate enough to have enjoyed his friendship or to have been connected with him in his many-sided career, but to a host of scientists and industrial chemists who, though they may never have known him personally, cannot have failed to appreciate how much, in his characteristically unostentatious manner, he contributed to the advancement of some of our most urgent national problems with never a thought to anything other than his country's interests. In the minds of many Sir George will be most prominently associated with the remarkable and orderly collection of plant and buildings which in the past five years has sprung up on the site of the Fuel Research Station at Greenwich, a full-scale experimental works of entirely his own creation, and which must surely serve as a monument to his genius for many generations to come. It was in later years as a fuel technologist and as the originator of the therm that Sir George was, perhaps, best known to the majority; but his influence in some of the more orthodox branches of industrial chemistry must not be overlooked, and it has been rightly said that his was the creative brain behind the great firms of Castner-Kellner and the Cassel Cyanide Company. As an instance of his inherent dislike of publicity, we may recall that when, on his retirement as Director of Fuel Research just about a year ago, we felt that his services to his country could not be permitted to pass unnoticed in our columns, we remarked that his characteristic modesty had proved a considerable obstacle in the attempt to do justice to his work, but eventually one of his colleagues persuaded him to permit a few notes to be passed for publication. This little appreciation, which appeared in THE CHEMICAL AGE for September 29 of last year, gives, perhaps, as faithful an insight into Sir George's personality and career as has ever appeared. Our contributor then remarked that when Sir George undertook the responsibilities of the Fuel Research Board the country secured " the voluntary services of one who has literally unique qualifications, for he combines the outlook and standing of an eminent scientist with the wide experience of a builder of industries."

Points from Our News Pages

An article is published dealing with the " Use of Colloids in Medicine," by Mr. A. Davidson (p. 134).

A note from a correspondent deals with the recent announcement of the alleged transmutation of mercury into gold (p. 136).

The death of Sir George Beilby, F.R.S., LL.D., occurred last week, and an outline is published of his work for industrial chemistry, and in other fields (p. 137).

Sir Robert Robertson's address as President of the Chemistry Section at the British Association Meeting in Toronto is published in the form of a comprehensive summary (p. 138).

Reviews of some recent works connected with industrial chemistry are given (p. 141).

Interest in the Chemical Exhibits at the British Empire Exhibition is on the increase (p. 142).

Owing to the holiday there is very little to report in the London chemical market (p. 149).

Considerable improvement is reported in the Scottish heavy chemical market, and export inquiries are more plentiful (p. 152).

The Calendar

Aug. 6–13	British Association for the Advancement of Science Meeting	Toronto
9	North of England Institute of Mining and Mechanical Engineers; Annual General Meeting, 2 p.m.	Lecture Theatre of the Institute, Newcastle-upon-Tyne.
Sept 4–5	Iron and Steel Institute Autumn Meeting	British Empire Exhibition, Wembley
8–11	Institute of Metals	London
Nov. 14	Society of Chemical Industry: Annual Autumn Dinner	London

The Use of Colloids in Medicine

By A. Davidson, B.Sc.

The following article deals with some applications of colloid theory to the practice of medicine. The matter is of interest to the chemist, since such applications of a science always produce reactions on the science itself.

In recent years an ever increasing application has been made to physiology of the knowledge of colloids accumulated in the last half century. It is probable, indeed, that in the immediate future, the line of greatest advance in the solution of biological problems will be in the direction of the study of the physical changes in the tissue colloids, rather than in the study of the chemical constitution of individual substances occurring in the living body. The work of Emil Fischer, Willstätter, and others has apparently covered the latter field of work in broad outline as far as it can usefully be carried at present, although many details remain to be filled in. It is now generally recognised that normal physiological functions, and the disturbances of these which constitute pathological conditions, are not merely a matter of chemical changes, but that changes in the state of division of substances and in other associated physical properties are also involved. Sometimes, in fact, these physical changes may be the only ones involved. For example, the explanation of blood-clotting given by the chemical theories of ten or twenty years ago led to the postulation of a large number of chemical individuals (which have never been isolated), such as fibrinogen, prothrombin, prothrombokinase, anti-thrombokinase, and several others supposed to take part in the phenomenon at various stages. This explanation never carried conviction owing to its complexity, and it is now regarded as more probable that the coagulation of the blood is essentially an interaction of colloids under the influence of electrolytes. It is equally probable that, in many cases, diseases are partly dependent on changes in the state of division and associated properties of the proteins, lipoids, etc., of the tissues, that is, they are colloidal phenomena. Martin Fischer (*Oedema and Nephritis*, 1910) has plausibly argued, for instance, that œdematous swelling of tissue is caused by the tissue colloids taking up excessive amounts of water under the influence of an increased acid reaction of the blood. There are difficulties in the way of this particular theory, but the trend of thought in this direction is noticeable.

Colloids of the Blood

An interesting and important contribution from colloid physics to practical medicine was made by Sir William Bayliss during the war. In cases of shock due to hæmorrhage from wounds or to surgical treatment it was found that the immediately important aspect of the loss of blood was not the fall in the number of red corpuscles, but the diminution in the volume of the blood. The obvious remedy was to increase the mere volume of the blood without troubling about the supply of corpuscles, and the simplest means of doing this was to inject salt solution. This, however, produced only a short temporary increase in the blood volume and pressure, which soon fell to their previous level. The explanation of this result was given by Professor Bayliss (*Proc. Roy. Soc.*, B., 1916, **89**, p. 380). It depended on the fact, previously established by Starling, that colloids show osmotic pressure, and in particular that the colloids of normal blood have an osmotic pressure of 30–40 mm. of mercury. Now the blood starts on its course with a pressure in the large arteries of about 100 mm. And the walls of the blood vessels, while impermeable to colloids, are freely permeable to crystalloids and water. The consequence is a continuous loss of water and crystalloids to the surrounding tissues until, in the capillaries, the blood pressure has fallen lower than the osmotic pressure of the blood colloids. For the rest of its course through the capillaries and the veins the blood is absorbing water by osmosis from the tissues and the blood volume is restored. Now, where loss of blood from the body has occurred, and salt solution has been added to make up the volume, the blood pressure is at first restored to the normal 100 mm., but at the same time the osmotic pressure of the blood colloids is diminished, owing to lower concentration. There is now a loss by filtration of water and crystalloids from the blood during a much longer portion of its course, and the portion available for re-absorption by osmosis is correspondingly shortened. The added volume of salt solution is therefore soon lost.

If this were the correct explanation, it was obvious that in restoring the blood volume, the osmotic pressure of its colloidal contents must not be allowed to fall—that is, an addition of colloidal matter as well as of salt solution was required. Naturally, on this theory, the kind of colloid used did not matter so long as it was harmless in itself and did not react with the blood colloids. Bayliss chose gum acacia as the most convenient, added it to the solution to be injected in amount sufficient to bring its colloidal osmotic pressure up to that of the blood, and found that in this way the blood volume and pressure were maintained at the required level. A gum solution of this kind was used extensively and successfully during the war.

The use of colloidal gold (or, more recently, colloidal gum benzoin) has been advocated for the diagnosis of syphilis. Under certain conditions these colloids are precipitated by the blood serum or the cerebrospinal fluid of syphilitic persons, though unaffected by the normal fluids. It has been claimed that the colloidal benzoin test is as reliable as the Wassermann test, and at the same time much simpler.

Colloidal Remedies

It is possibly a recognition of this trend of biological science towards colloidal theories which has caused the recent introduction of colloidal remedies. During the last ten years a new kind of therapeutic agent has come into use in medical practice in the form of colloidal sols, chiefly of the heavier metals or their hydroxides and of some of the non-metals. Substances in the colloidal state have, of course, long formed part of the pharmacopœia, but this was accidental and was the result of these substances being obtained naturally or most conveniently in this state. The new feature of recent years is the deliberate conversion of remedies, formerly used as soluble salts or in powder, into the colloidal state. The argument for their use apparently is that since the disease is colloidal, the remedy for it must also be colloidal. An enthusiastic advocate of this form of remedy, A. B. Searle, has maintained that " before a drug can exert its full therapeutic action it must be converted into the colloidal state." (*Brit. Assoc. Reports on Colloid Chemistry*, 2nd Report, 1918, p. 159.) It would be difficult to substantiate this statement.* Sugar sodium, potassium and calcium salts, and oxygen are not in colloid form. Again, ordinary food, which is mainly colloidal, is changed by the processes of digestion in the alimentary canal into the sugars and amino acids—crystalloid materials in true solution—before it can be absorbed and assimilated. The body is therefore not entirely composed of colloids, nor are its processes entirely of a colloidal nature. The real justification for the use of these remedies rests on other grounds.

We know much more about matter in the colloidal state than was known in the days when Graham could talk mystically of colloids possessing " Energia." And though our knowledge is not complete, every advance made has served to bring more and more of the observed facts into line with already ascertained physical laws, the ordinary laws of dynamics and electricity. It will indicate more exactly the writer's point of view if a summary of the present knowledge of colloids is given.

If any substance is subdivided in a fluid medium, in which it is insoluble or only slightly soluble, so that its particles fall below a certain limit in size, they will remain in permanent suspension in that fluid so long as they keep below this definite size limit, and will thus form a colloidal sol. This limit is below the limit of microscopic vision, but is usually much above the size of a single molecule, unless the molecule be very large. The particles in such suspensions are therefore, in general, aggregates of many molecules. The vibratory motion of the molecules of the fluid in which they are dispersed sets up in these particles a similar vibratory motion (the Brownian movement) visible in the ultramicroscope. Also,

*Or a similar statement, made by a firm of manufacturers of these colloidal medicines, which claims as an advantage for them that they are " isomorphic " with the elements of the body. We might agree to this if we could give assent to the proposition that things which are shapeless are similar in shape to one another.

at the surface of separation between each particle and the fluid a difference of electrical potential develops, so that the particles become similarly charged, either positively or negatively, with respect to the medium. Again, the dispersion of the substance into a large number of very small particles results in the development of an enormous extent of surface for a small quantity of substance, and this brings into effective play forces, such as surface tension, whose effects are negligible in particles of visible size. This large extent of surface enables the dispensed substance in some cases to catalyse chemical reactions. In a colloidal sol, the particles may be caused to aggregate by addition of electrolytes or of colloids of opposite charge so that the substance is thereby precipitated.

Theory of Their Action.

How, then, will colloidal silver, for example, act on the living body as compared with silver nitrate solution? In the first place, the chemical action of the colloid, if any, will be slow, since the colloid particles are aggregates of large numbers of molecules and only those on the surface of each particle are immediately available. Moreover, the average speed of the colloid particles is equivalent to a comparatively low temperature with a correspondingly low rate of chemical action. This slowness of reaction may be advantageous in medical use. There is some evidence for the belief that whatever chemical reaction does occur with a colloid is due to a minute proportion of the dispersed substance being in true solution. Thus, an equilibrium exists in the colloidal sol between that part of the substance which is in colloidal dispersion and that which is in true solution. If the part in solution is used up in chemical change, a fresh quantity of the colloidal part goes into solution. On this view, a colloidal remedy may be regarded as a convenient means of administering a substance in minute concentration without requiring a large bulk of solution, since the main portion acts as a depot for the supply of chemically reactive substance as and when required. This, it has been argued (Bayliss, *Lancet*, 1922, p. 40; Dale, *J.S.C.I.*, 1920, 211R) is the main justification for the use of colloids as therapeutic agents. The application of colloidal sols of the free bases of quinine, cocaine and other alkaloids which are sparingly soluble in water, has obvious advantages over their use even in the freshly precipitated form. But in these cases it can be shown that the effect of the colloidal preparation is wholly accounted for by that part of the drug which is in true solution. In the cases of the heavy metals, silver, mercury, copper, antimony, bismuth, etc., which have long been known to have powerful pharmacological effects, chiefly of an antiseptic nature, they could formerly only be applied in the form of salts in small doses. These were soon excreted, or otherwise put out of action. Further complications were introduced by the formation of acids from these salts by hydrolysis in aqueous solution in the tissues. Here again, the administration of these metals as colloidal sols has the great advantage of enabling larger doses to be given, since the inert colloid continuously gives off traces of its constituent element into solution which then becomes chemically active, and in this way a renewed supply is kept up. The disturbing acid radicals are also in this way eliminated. There is the further advantage that the colloidal sols can be applied directly to the tissues affected by intramuscular injection or may be introduced by intravenous injection directly into the blood stream.

Clinical Results

Colloidal silver, mercury, copper, arsenic, antimony and bismuth have all been successfully applied in cases where antiseptic action is the chief requirement; silver, for example, in septic wounds, gonorrhœa, etc.; mercury in syphilis, and so on. A colloidal sol of cuprous subhydroxide is said to have given excellent results in cancer. Its use in this disease is based on the property, which seems to be specific to copper, of inhibiting the growth of the living cell. Remarkably good results in the treatment of boils have been obtained with colloidal manganese applied by intramuscular injection in very small doses.

Among the non-metals, colloidal iodine has proved successful both as an antiseptic and in replacing iodides in the treatment of syphilis. Apparently, also, the danger of iodism is removed by the use of colloidal iodine in place of iodides. Colloidal sulphur is, of course, because of its finer state of division, a great improvement on the formerly used flowers of sulphur or precipitated sulphur. It also effectively and pleasantly replaces the nauseating "sulphur waters."

A large amount of clinical evidence as to the value of colloidal sols is scattered through the issues of the *British Medical Journal* in various papers from 1913 onwards. But it should be mentioned that the results given in the literature have, in nearly every case, been obtained with colloids sold by a British firm under the trade name of "Collosols." Different results might be obtained with the preparations of other firms owing to differences in the methods of manufacture. So far as the writer is aware, no systematic investigation of the pharmacology and therapeutics of colloids has been attempted, or at least published.

Manufacture of Colloidal Remedies

The methods of preparation of colloids fall naturally into two classes:—

(i) Condensation methods, in which the substance concerned is liberated as single atoms or molecules, and these then coalesce to form aggregates of suitable size, the conditions being so arranged that this process of aggregation stops at a certain limiting size of particles;

(ii) Dispersion methods, in which starting with relatively large particles these are broken down into ultramicroscopic particles.

Prepared by either method, the sols are too sensitive to the action of electrolytes to be used for medical purposes. If required for intravenous injection they must be made isotonic with the blood plasma in order to prevent laking of the blood. This necessitates the addition of salt. The quantity of salt required would generally be sufficient to precipitate the colloid. A protective colloid is therefore added to stabilise the sol. Examples of protective colloids in common use are gelatin and egg-albumen. Others are mentioned in the patents quoted below. But it is of interest to note that the sodium salts of protalbic and lysalbic acids have been found in recent years to possess the protective power in high degree. These colloids are products of partial hydrolysis of egg-albumen by dilute caustic soda. Apart from the necessity of using protective colloids to prevent coagulation in the blood or tissues, they are also required to stabilise the colloids as commercial articles which must withstand transport and long periods of storage.

The details of the methods used in the manufacture of medicinal colloids are probably to a large extent trade secrets, but certain patents have been taken out which give some indication of the processes.

Condensation Methods

In two patents by Crookes and Stroud (B.P. 21,521 of 1911, and 28,776 of 1912) a very dilute solution (about 1 in 1,000) of a salt of the metal whose colloid sol is required is added to a distilled water solution of peptone, gelatin, dextrine or metal extract to which common salt has been added, and the mixture warmed at 100° F. for two days. For example, 300 grains of peptone and 800 grains of salt are boiled with 1 quart of distilled water, cooled and filtered. This solution is mixed with a solution of 27·59 grains of silver nitrate in 1 quart of water and the mixture, after standing for 24 hours, is heated as above, any precipitate formed being filtered off. The peptone here serves the purpose both of reducing agent and of protective colloid. Metal colloids so obtained are said to be stable and not precipitated either by electrolytes or by weak electric currents up to 100 milli-amps. In the later patent a little phenol is added, presumably as a preservative.

B.P. 1,219 (1912, A. Dering) describes the preparation of colloidal sols of mercury in oils such as poppy, linseed and the like, containing triglycerides. Here the oil serves as reducing agent as well as disperse medium. Five parts of mercuric chloride are heated with 100 parts of poppy oil for 20 minutes over an open flame. The oil is then dissolved in ether, washed with water, dried and freed from ether..

Some patents by Lilienfeld (B.P. 156,725, 173,230 and 173,507 of 1921) describe the use of water-soluble alkyl or aryl ethers of polysaccharides such as cellulose, starch, dextrine, etc., as protective colloids.

In the above cases, colloidal sols of heavy metals whose salts are easily reducible, are prepared, and in these cases the protective colloid used may be a sufficiently strong reducing agent for the purpose. Usually, however, a special reducing agent is added, such as formaldehyde, ammonium formate,

or the exceedingly powerful hydrazine hydrate. In the cases of sulphur and selenium, the elements are set free from their compounds by oxidation or by combined oxidation and reduction. B.P. 7,238 (1913) prepares colloidal sulphur by introducing sulphur dioxide and sulphuretted hydrogen simultaneously into dilute hydrochloric acid.

The purification of colloids by dialysis is slow and, though dialysing apparatus has been greatly improved, for example by the use of collodion instead of parchment membranes, other methods have been developed which have proved much more rapid. For instance, electrical endosmose has been applied to the purification of colloidal sols of silica, metals, etc., by Schwerin and the Gesellschaft für Elektro-Osmose in a series of British Patents, Nos. 14,235 (1912), 29,049 (1912), 9,237 (1914), 9,261 (1914), and 15,267 (1914). Again, ultrafiltration under pressure has been developed by Bechhold so as to render possible the separation of colloids of varying size of particles from their disperse media. Bechhold made membranes of different degrees of permeability by depositing solutions of gelatine and collodion of varying strengths on a suitable base. An ultrafiltration process has been patented in B.P. 155,834 (1921). A third method of purification of these colloids consists in the precipitation of the colloid, *e.g.*, by alcohol, followed by washing of the precipitate and redissolving. While the pure metal colloid is irreversible, the complex of metal and protective colloid is usually a reversible colloid, which renders this method possible.

Dispersion Methods.

Coming now to dispersion methods of preparing colloids we have Bredig's method of dispersion by an electric arc, with poles of the metal whose colloidal sol is required immersed in water or some other medium. This method, greatly improved by Svedberg, has been applied to the preparation of colloidal sols of almost all the metals. Apparently, metallic colloids prepared by some such method have been used medicinally, more especially on the Continent, but information as to their process of manufacture is wanting. Searle states (Brit. Assoc. 2nd Colloid Report, p. 172) that "colloidal metals prepared by Bredig's method are unsuitable for medicinal purposes as they are not only unstable in themselves, but are rapidly decomposed by electrolytes present in the human organism." Since pure metallic colloids prepared by other methods are also unstable in themselves and decomposable by electrolytes, this hardly seems a convincing condemnation of the Bredig method. Probably it simply indicates that the British manufacturer has not been able to combine this method of preparation with the use of protective colloids, owing, perhaps, to the decomposition of the latter by the electric arc.

The recent invention of the colloid mill marks a great advance in convenience of preparation of colloids. Several mills of this kind have been introduced in the last few years, but the best known is that of Plauson (B.P. 155,836, 1920). Starting with a substance in powder form (from an ordinary grinding machine), this is circulated in the closed chamber of the mill, with a suitable liquid as dispersion medium, by rotating an arm-wheel at very high speed (1,000 to 3,000 r.p.m.) so that the arms pass close to baffles at two points, and at these points the effective grinding pressure occurs. The quantity of dispersion medium must be large compared with that of the substance to be dispersed, and a "dispersion accelerator" is added. This dispersion accelerator is really the protective colloid of the older methods under another name. A detailed description of the mill is given in an article by Foster and Reilly (*J.S.C.I.*, 1922, p. 435 R).

Although the Plauson mill is essentially a disintegrating machine, advantage is claimed for its use in condensation methods of preparing colloids, on the ground that the action of the mill favours the stoppage of condensation at the proper point and prevents or discourages the formation of the grosser particles apt to be formed to some extent in the ordinary condensation methods. This is the justification for the use of the Plauson mill in preparing colloidal metals, etc., for medicinal purposes, by methods otherwise similar to those already described. For example, in B.P. 182,696 (1922), colloidal silver is prepared by reducing ammoniacal silver nitrate with formaldehyde in presence of agar-agar as protective colloid. Colloidal solutions of other metals and non-metals are similarly prepared.

Obtaining Gold from Mercury

[From a Correspondent.]

The announcement a short while ago in the daily press that Professor Adolf Miethe, professor of photochemistry in the Charlottenburg Technical High School, had transmuted mercury into gold was received with incredulity by scientists in this country, because it was very difficult to see how the energy supplied by the high-tension electric current stated to have been used would suffice to disintegrate the mercury atom; in Professor Rutherford's experiments on nitrogen, etc., the enormously greater energy of α-particles was employed. Professor Miethe has now published a preliminary account of his work, which contains a number of interesting details and which must be taken seriously into consideration in estimating the validity of the claim he has made.

Deposit in Mercury Vapour Lamp

In June, 1923, Professor Miethe started to use an improved form of mercury vapour lamp in his researches on the action of ultra-violet rays on transparent minerals and glasses. Early this year he and his assistant, Dr. Stammreich, noticed that a black deposit was formed on the inner surface of the lamp when a too powerful current was employed. The maker of the lamp, A. Jaenicke, had made the same observation and had tried unsuccessfully to identify the constituents of the deposit, so he supplied the professor with about 0·5 gram of it, a quantity which had been formed from the use of 5 kilograms of mercury in the lamps, and the latter succeeded in isolating gold from it, as well as other substances which had undoubtedly been present as impurities in the original mercury. All the original mercury, Jaenicke states, had been previously twice distilled. Professor Miethe has repeated his experiments and in all the successful ones he used a potential difference of 170 volts between the electrodes; the current was passed from 20 to 200 hours, and the lamp consumed 400 to 2,000 watts. It appears probable that a certain critical voltage is essential to success because no trace of gold could be found in the mercury from the older type of lamps that had been in long use, and because negative results only were obtained when the P.D. was allowed to fall below a certain value. It was proved that there was no gold in the electrical connections, and in the crucial experiments the freedom from gold of the original mercury used was confirmed independently by K. A. Hofmann.

Identification of the Gold

The amount of gold obtained being very small, from 0·1 to 0.01 mgrm., great care had to be taken in identifying it. When the mercury contained in the black deposit was dissolved out with nitric acid, the yellow residue was found to consist of octahedral and cubical crystals possessing a highly reflecting surface; if the mercury was volatilised at a red heat, the residue consisted of kidney-shaped and botryoidal crusts. Obtained in these ways, the metal was readily soluble in aqua regia, and the solution in that solvent gave on evaporating the same crystals as those yielded by natural gold under the same conditions; it was malleable and showed the streak of fine gold; and it answered to all the delicate tests for gold, including the purple-of-Cassius test by means of which one part of gold in 100 millions can be detected. Experimental difficulties prevented the determination of its atomic weight and proof of the simultaneous production of helium or hydrogen, or of α- or β-rays.

Japanese Consumption of Food Colours

The consumption of colouring matters for food, derived from coal tar, in Japan has increased 100 per cent. during the past two years, the average monthly importation having increased from 700 lb. in 1922 to 1,650 lb. during the first four months of 1924. The increasing popularity of foreign style confectionery and fancy pastry in Japan is further stimulating the demand for food colours. Confectioners, bakers, manufacturers of carbonated waters and soft drinks are gradually requiring more and more synthetic colouring matter.

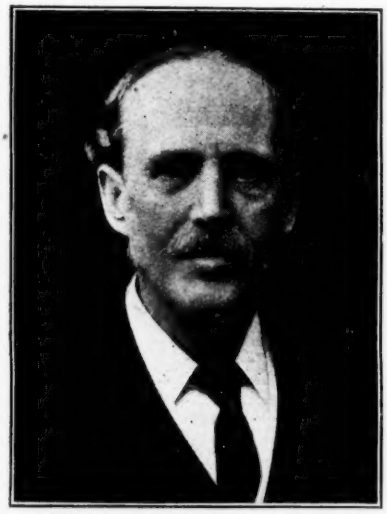
German coal-tar food colours were once preferred in Japan, for the reason that they were obtained for about one-third of the cost of other colours. Recently, however, a more strict enforcement of the Japanese pure food regulations has caused a number of firms to use American and English colours in preference to the inferior German makes, which do not in all respects comply with the Japanese pure food regulations.

Death of Sir George Beilby

Late Director of Fuel Research

WE regret to announce the death of Sir George Thomas Beilby, F.R.S., LL.D., in London, on Thursday night, July 31, aged 74 years. He was the first Director of the Fuel Research Board, under the Department of Scientific and Industrial Research, from which position he retired only a year ago.

Sir George Beilby was the son of Dr. G. T. Beilby, of Edinburgh, and was educated at private schools and Edinburgh University. He was president of the Society of Chemical Industry in 1899, of the Chemistry Section of the British Association at their meeting in South Africa in 1905, of the Institute of Chemistry from 1909 to 1912, and of the Institute of Metals from 1916 to 1918. His public positions also included service on the Royal Commission on Coal Supplies in 1903, and the Royal Commission on Fuel and Engines for the Navy in 1913. He was knighted in 1916, and in 1917 when the



THE LATE SIR GEORGE BEILBY

Fuel Research Board was founded to carry out accurate large scale experimental work on coal carbonisation, alcohol production, and other matters connected with conservation of fuel, Sir George Beilby was appointed director.

Contributions to Chemical Research

Sir George Beilby made many contributions to industrial chemistry, having introduced various improvements in manufacturing processes. In 1881 he patented, together with Dr. James Young, a vertical retort which practically restored the shale oil industry in Scotland. The total output in this industry is now about four times what it was in 1880, and the yield of permanent, or fuel, gas per ton of shale was increased from 3,000 to 10,000 c. ft. by the use of the Young-Beilby retort. Sir George Beilby was also the first to use the tower stills for the production of ammonia which was one of the chief factors in the economic success of the Scottish shale industry.

Another important process developed by Sir George Beilby was the manufacture of cyanide of potash, which was just coming into demand for gold extraction. Sir George Beilby took out a patent for his process in 1891, and in 1892 the Cassel Cyanide Co. started making cyanide at Maryhill in Scotland.

In the field of metallurgy Sir George took a prominent part. Among other points, for example, he demonstrated that the process of polishing is essentially different from that of grinding, and that in the former process a thin layer of "flowed" metal is produced on the surface which fills up the gaps in the scratched surface.

Sir George Beilby founded the first fuel research laboratories in the country at the Royal Technical College in Glasgow, and these were later taken under the control of the "Young" Chair of Chemical Technology.

Sir George leaves a widow and a son and daughter. Lady Beilby was a daughter of the Rev. S. Newman, and they were married in 1877. His daughter married Professor Soddy, of Oxford University, in 1908.

Personally, Sir George Beilby was characterised by a strong dislike of publicity, and few knew the full extent of his work. The late Lord Fisher, who was in a position to know the value of many of his services to the Government, described him as "the greatest living chemist, as meek as Moses, and as thorough as Cromwell."

An appreciation of Sir George Beilby by one who was closely associated with his work appeared in THE CHEMICAL AGE of September 29, 1923, on page 332.

Mourners at the Funeral

The funeral was held at Golders Green crematorium on Tuesday. The chief mourners who attended the religious service in the mortuary chapel were Lady Beilby (the widow), Mr. H. M. Beilby (son), and Professor and Mrs. Soddy (daughter).

Among the late Sir George Beilby's friends and others who attended to pay a last mark of respect were Mr. Gerald Balfour, Mr. G. H. Pryor (representing Mr. Shinwell, President of the Ministry of Mines), Mr. G. S. Shaw Scott (Secretary of the Institute of Metals), Mr. J. E. Barnard (Royal Microscopical Society), Dr. Ventose, Mrs. Shields, Mr. A. S. Michie, Professor C. S. Gibson (representing the Chemical Society), Mr. Weller, Sir James Burnett, Sir Herbert Jackson, Mr. Ludovic Foster, Colonel Sir Edward Brotherton, Mr. F. S. Spiers (representing the Faraday Society and the Institute of Physics), Professor Carpenter, Dr. Slack, Mr. J. L. Deuchar, Mr. Neill (Cassel Cyanide Co.), Dr. J. P. Longstaff (representing the Society of Chemical Industry), Dr. Murray Hill, Dr. Stockdale (Glasgow), Lieutenant-Colonel W. J. A. O'Meara (Honorary Secretary of the British Science Guild), Sir Charles Sherrington (President of the Royal Society), Sir Frank Heath (Secretary of the Department of Scientific and Industrial Research), Sir Frederick Latham, Mr. Llwellyn S. Lloyd (Department of Scientific and Industrial Research), Dr. C. H. Lander (Director of the Fuel Research Board), Mr. J. G. King (representing Captain Shaw, chief engineer of the Fuel Research Board), Mr. Grant Hooper, Dr. Macfadden (Hampstead), and Miss Eugenie Todd.

The service in the chapel was conducted by the Rev. L. S. Hunter, of Newcastle-on-Tyne (son of the Rev. John Hunter, the well-known divine, whose church Sir George Beilby attended while in Glasgow). After the cremation the ashes were scattered in the garden of rest adjoining the crematorium.

The Future of Muscle Shoals

Proposal to Manufacture Cyanides at U.S. Plant

THE future of the great government-built nitrogen fixation factory at Muscle Shoals, Alabama, is still in the balance, but latest reports from the States indicate that disinterested chemists are coming more and more to the belief that the location is more suited to become a centre for general chemical manufacture rather than for the production of fertilisers. The difficulties which have overtaken the cyanamide process even in Norway, has led to the conclusion that these difficulties are fundamental and that it is apparent that this process would have little practical promise at Muscle Shoals. It is agreed quite as generally that Muscle Shoals is not the place for the application of the Haber process. The proposal to make urea at Muscle Shoals likewise excites no enthusiasm from disinterested chemists. They point out that urea never has been developed at a price which would permit its use as fertiliser and there is very general doubt that this could be accomplished at Muscle Shoals.

On the other hand, no reason is seen why the cyanamide and the carbide plants may not be kept intact. The opportunities are favourable, it is believed, to the manufacture of sodium cyanide and various cyanogen compounds. The prussiates particularly could be made to advantage, it is thought. Synthetic acetic acid and various acetylene derivatives constitute another group, the manufacture of which could be undertaken at Muscle Shoals. In fact, the opinion prevails that a long list of chemical salts and compounds could be manufactured to advantage at Muscle Shoals, and it is fully expected that it will become in time a great centre of the manufacturing chemical industry.

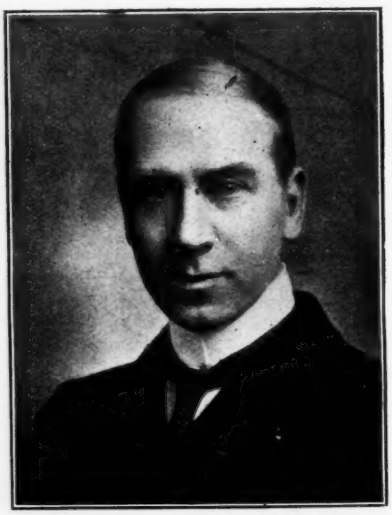
The British Association Meeting at Toronto

Sir Robert Robertson on "Chemistry and the State"

Sir Robert Robertson, F.R.S., the Government Chemist, is President of the Chemistry Section at the British Association meeting now being held in Toronto, and his presidential address, which was presented on Thursday, dealt with the subject of "Chemistry and the State," reviewing the activities of the British Government before, during and after the war. The summary given below is substantially identical with that prepared by Sir Robert Robertson for the complete printed address.

THE State's appeal to chemistry has developed through the gradual recognition of the need for the application of that science to matters relating to its preservation, its currency, its financial support, its health, its food supply, its industries, and finally to academic science.

In the course of this development, advantage has been taken, if sometimes tardily, of the general advance in chemical knowledge, and frequent recourse has been had to the advice of well-known chemists of the day, and collectively of the Royal Society; thus for various purposes the following chemists, as officials or consultants, have in the past afforded assistance in the solution of specific problems referred to them, or by taking part in Commissions: Boyle, Newton, Davy, Faraday, Daniell, Graham, Hofmann, Redwood, Abel, Roberts-Austen, Percy, Dupré, Playfair, Frankland, Ramsay and Dewar. It has happened in several instances that as a result of these Commissions and references to chemists some definite chemical activity of the State has emerged.



[*Photo: Lafayette*

SIR ROBERT ROBERTSON, F.R.S.

Before the War

Defence.—For its defence, establishments for the production of explosives were early maintained, and when this ultimately took the form of a chemical manufacture the Government factory took the lead in devising efficient processes, while from the various State research establishments has issued during the last fifty years an important body of original contributions to the theory of explosives and to the knowledge of their properties.

Metallurgy.—The metallurgical progress of the country has always been a concern of the State by reason of its application to defence by land and sea, and close touch has been maintained with successive developments in the manufacture and use of cast-iron, wrought iron, steel and non-ferrous alloys. While the main advances in process have been made in the great iron and steel works, material contributions to knowledge in this sphere have been made by chemists in the Government service.

Revenue.—For its revenue, imposts were applied in early times, but with great uncertainty, until the charge was put on a scientific basis. Very accurate tables for the strength of alcohol were worked out under the supervision of the Royal Society at the end of the eighteenth century, to be superseded by revised ones issued only a few years ago, when, in addition, new tables were issued also by the Government Laboratory for determining the gravity of worts before fermentation. The question of rendering alcohol unpotable, but still useful for industrial purposes, has occupied much attention. As some misapprehension still exists as to the availability of alcohol for industrial purposes, a statement has been included in the address indicating the main facilities. It was on account of the necessity for safeguarding the revenue that the Government Laboratory was primarily erected, although it now performs chemical work for all State Departments.

Health.—The three main steps with regard to public health and sanitation in this period were the forcing of these questions into prominence by Playfair, with the consequent Commissions and legislation leading to the formation of the Local Government Board and its successor, the Ministry of Health, which has many varied activities in preserving purity of air and water and protecting the workman in dangerous trades: secondly, the determination of standards for a safe water supply by the pioneering work of Frankland; and thirdly, the appointment of public analysts by the local authorities, with the Gvernment Laboratory as referee, for safeguarding the supply of food.

Agriculture.—Science was being applied to agriculture about the end of the eighteenth century, and at the beginning of the next Davy did pioneering chemical work for the Board of Agriculture. Private endeavour is responsible for the next development, State action being limited to the prevention of fraud in the sale of fertilisers and feeding stuffs. In 1909, however, the annual allocation of a sum of money to the Development Commission for the advancement of agriculture stimulated research in a large number of institutions engaged in the scientific study of problems in which chemistry plays an important part.

Other Activities.—In addition to the chemical work reviewed in the foregoing sections, there is a variety of subjects connected with State Departments to which chemists have contributed, such as the composition of the sea, and the composition and physical chemistry of rocks and building-stone. At the Government Laboratory a large number of investigations have been conducted on matters directly referred from Government Departments.

During the War

In all the activities described, the war requisitioned the work of the chemist, but, naturally, predominantly to meet the demands of active warfare.

Defence.—The attention that has been bestowed on the subject of propellants enabled expansion to take place with no important alteration in the technique of their manufacture, to which was adapted a new type of cordite, ultimately made on the largest scale, without using an imported solvent. For high explosives we were in much worse case, as these had not been made by the Government, and were manufactured in Great Britain only in small quantity. Their study at Woolwich led to a rapid evolution of new processes, substances, and methods of use. Thus a method was worked out for the manufacture of trinitrotoluene, and to save this substance a new high explosive, amatol, was devised. This explosive, consisting of ammonium nitrate and trinitrotoluene, passed exhaustive trials and was ultimately produced at the rate of 4,000 tons a week. The production of the ammonium nitrate for the mixture was in itself a stupendous undertaking, and the method of filling the explosive into shell and other munitions gave rise to much ingenuity. In the Research Department, Woolwich, the number of qualified chemists engaged in the study of explosives in all their aspects ultimately exceeded a hundred, while for manufacture and inspection over a thousand were employed. The ideal set before himself by Lord Moulton in 1914, to produce nothing less than the maximum of explosives of which the country was capable, was realised, and they assumed a quality and character that cause them to be copied by our Allies, and in reliability proved themselves superior to those of the enemy.

Starting unprepared, and without the advantage of a well-developed fine-chemical industry, we were able ultimately, to make a reply in the field of chemical warfare that was rapidly becoming more and more effective; at the same time, by study and often self-sacrificing experiment, protecting the soldier by the development of very efficient respirators. In this connection and in that of explosives nearly every professor of chemistry in the country, and many from beyond the sea, were engaged.

Metallurgy.—The enormous demand for metals for munitions and countless other war requirements led to an unprecedented concentration of the metallurgical industries on the needs of the State, and to an equal concentration of metallurgical science on investigation devoted to improvement in quality of materials for new and special war purposes. The work of the Aircraft Production Department, aided by many metallurgists and engineers, on alloy steels, of the National Physical Laboratory on aluminium alloys, and of the Metallurgical Branch of the Research Department, Woolwich, on the heat-treatment of heavy forgings and on the drawing of brass, is typical of the successful effort made in every quarter. The knowledge thus gained was disseminated in the form of specifications, instructions, and reports, and has had a great and permanent effect on manufacture.

Health.—A committee of the Royal Society had been studying food values, and were able to afford the Food Controller, when he took office, valuable data bearing on the rationing of food. They had considered subjects which shortly became of much importance, such as a better recovery of flour in milling wheat. The chemical examination of the food for the Army in the war, carried out by the Government Laboratory, employed a large staff of chemists. For the supply of many fine chemical substitutes used in medicine and surgery, formerly imported from abroad, such provisional arrangements had to be made as the organisation of a large number of university laboratories on a semi-manufacturing basis.

Agriculture.—Effects on agriculture during the war were shortage of the usual feeding stuffs for cattle and of fertilisers. The chemists stationed at Rothamsted gave special attention to the shortage of manures and prepared instructions for the guidance of farmers; and several sources of supply of potash were exploited, including kelp, felspar, and the flue-dust of furnaces. As sulphuric acid was required for explosive work, fine grinding of phosphates and basic slag was found to be more efficient than was expected. Shortage also directed the attention of chemists to the use of little known foodstuffs, especially for cattle, and the information gained as to their feeding value was important.

Other Activities.—In many other activities in connection with the war chemists were directly involved, such as in affording advice on the conservation of materials, on the numerous questions arising from the operations of the War Trade Department, on the restriction of imports and exports, and on matters of contraband.

After the War.

The magnitude of the chemical effort, it can be claimed, was a factor in winning the war which must be reckoned as of importance only second to that of the bravery of our forces in the field. But it has left a lasting mark, and given to chemistry a value which, were it not for the rapidity with which the achievements of science are forgotten, ought to keep before the public its connection with almost every phase of activity.

Defence.—To take our subjects in the same order, we may consider some of the effects of the energy spent on the production of munitions. The intensive study of explosives and of other chemical substances used in the war had led to a more complete knowledge of their chemistry, their physical and explosive properties, and has advanced chemical theory. These advantages are not of military importance only, but are reflected in the production of trade explosives. The collected records of the Department of Explosives Supply afford examples of treatment of many problems of interest to the general chemical technologist, and not only to the explosives expert.

A further benefit was reaped by chemists in every position, from the professor to the youngest graduate, coming into direct contact with manufacturing methods and thus gaining insight into the applications of their science. While it is true that the opportunity came to few of these to take part in the design of plant and primary choice of process, nevertheless the experience was a novel one, as it led them into the field of technology, and cannot fail to have widened their outlook. It became apparent that there was a shortage of a type of chemist which had been developed in Germany, skilled in the transference of the chemical process from the laboratory to the works scale in the largest enterprises. A chemist of this type is one who, besides having a sound knowledge of chemistry and physics, has had experience in the materials of construction used on the large scale and in the operation of the usual types of plant for carrying out the operations of chemical manufacture, and who is capable of working out flow-sheets illustrating the process, and operating plant with every regard to economy. The need for instruction in such subjects had been borne in on men like the late Lord Moulton, and as a direct result of the war-time experience of our deficiencies in this direction has arisen the movement for erecting Chairs of Chemical Engineering in some of our universities. It is to be expected that from these schools, especially where the instruction is superimposed upon a full graduate course, will emanate men who will lead the way in the application of academic science to industry.

Metallurgy.—While the interest of metallurgical science in war material has fortunately fallen to a peace-time level, State participation in the support of scientific research remains far greater than before the war. In metallurgy it is exercised through the Department of Scientific and Industrial Research with its organisations of the National Physical Laboratory and the Industrial Research Associations, as, for example, those dealing with the non-ferrous metals and with cast iron. The State also continues to maintain efficient research establishments for the Fighting Services, but it is significant that the largest of these is undertaking industrial metallurgical research on a considerable scale, for the benefit of the brass and other industries. State support and encouragement are undoubtedly powerful factors in the rapid progress now taking place in every branch of metallurgical science in this country, and there is scarcely any related industry which can fail to benefit.

Revenue.—Since the war the principal matters affecting the revenue are the higher duties, which have rendered necessary a further denaturation of alcohol. Improved facilities have been granted for the use of alcohol for scientific purposes and in industry; regulations have been formulated for the use of power alcohol, and duties have been established on imported fine chemicals and synthetic dyestuffs.

Health.—The food shortage during the war called attention to the nature and quantity of our food supplies, and led to further investigations being undertaken by the Department of Scientific and Industrial Research on food preservation and storage. Activity is also shown by the appointment of Committees which are working on the subject of preservatives and colouring matters in food, and on the pollution of rivers by sewage and trade effluents. A great field is open in the co-operation of chemistry with medicine in the discovery of substances suitable for the treatment of the numerous diseases now traced to parasites in the blood.

Agriculture.—So far as fertilisers are concerned, the lack of a supply of fixed nitrogen from the air which obtained throughout the war has now been rectified, and Great Britain for the first time is no longer exceptional among the nations by neglecting to provide itself with synthetic ammonia for agriculture and for munitions. Synthetic Ammonia and Nitrates, Ltd., carried on the work started by the Nitrogen Products Committee in 1916, and erected a large-scale plant at Billingham-on-Tees, which is now producing 150 tons of synthetic ammonia per day. Such war-time expedients as the use of nitre-cake instead of sulphuric acid for making ammonium sulphate and superphosphate and the recovery of potash from flue-dust have not survived, but there has been a gain in the further development of "synthetic farmyard manure" and the increased use of basic slag. The present activity in research in agricultural chemistry of a fundamental character is leading to a better understanding of problems of the soil and of plant and animal nutrition, and cannot fail to be of ultimate benefit to farming.

Organised Applied Research and Assisted General Research.—Established during the war as a result of an appreciation of the contrast between the successful application of scientific method to military purposes and the want of such application to many of our manufactures, the Department of Scientific and Industrial Research has extended over a wide field. Its main activities have been sketched in the directions of State encouragement to industry to apply chemistry to its problems, of State investigation of vital problems beyond the sphere of private enterprise, and of assistance to workers in the purely academic field. In all these spheres activity is shown by the contributions to knowledge already forthcoming.

Increased Number of Chemists

In the expansion that has occurred in the chemical sections of State Departments since the war, it is interesting to note the increase in the number of chemists that are employed. As far as can be gathered, the number of chemists working in departments maintained wholly by the State is 375 for the present year, compared with 150 in 1912, while in establishments to which the State affords partial support, such as those under the Development Commission and the Research Associations, the corresponding numbers are 150 and 50. In addition, grants are made to 145 research students and to 11 independent research workers, involving a yearly sum of about £50,000.

A Change in Attitude

From the foregoing account of the connection of the Departments of State in the United Kingdom with chemistry, it is possible to trace a gradual development and ultimately a change in attitude, in passing through the stages of compulsion, expediency, and assistance.

From motives of security the State was compelled to give heed to chemical matters involved in its defence, such as those which appertained to munitions of war, including metals used in their manufacture; it was constrained to uphold the standard of its currency; and it was obliged to secure a revenue. As a consequence, the first chemical departments were set up in connection with these activities, and from them have emanated notable additions to chemical knowledge, improvements in methods of manufacture, and specifications for Government requirements that have led to improved material becoming available for civilian use. Although mostly conducted with inadequate staff, the study of these questions, it can be claimed, proved of national advantage when the time of need arose.

In the next stage, the public conscience having been awakened by the pioneering work of Playfair, it appeared expedient to safeguard health by attention to sanitation, and, as the quality of food was unsatisfactory, to set up a chemical control. Although a start was made by Davy, a member of the then Board of Agriculture, progress in this subject passed to private enterprise, and a century elapsed before direct assistance was afforded to this important matter. Out of these activities come our present system of supervision over the purity of air, water, and food, and also the recent progress made in the application of chemistry and physics to problems of the soil.

The Obligation o the State

The last and more recent stage is in the nature of a recognition that the State is under an obligation to assist science, and in this case the science of chemistry, on which so many important industries are based. It took the war to bring home the danger that, although the record of the country as regards discovery in pure science was unrivalled, its systematic application was too often left to other countries, with the result of lamentable shortage during war and the risk of many industries being ineffective in peace. A measure of Government intervention and action appeared requisite, and research became the business of a Government Department. Outside of the great firms which maintain progressive chemical staffs, the firms in numerous industries have been encouraged and assisted to co-operate in the betterment of their manufactures by the application of the methods of science, and from these associations and the organisations dealing with national problems begins to flow a stream of communications indicative of useful work accomplished. Nor is the foundation of it all neglected, for encouragement is given to workers in the academic field to follow out their ideas, whithersoever they may lead them, in accordance with the truth that "research in applied science might lead to reforms, but research in pure science leads to revolutions."

It is important to be able to record an advance in securing an interchange of information among Government Departments, and between their work and that of the universities, a matter which before the war was unsatisfactory, as it was mainly personal and sporadic.

And it is a hopeful sign also that, although the knowledge and appreciation of the methods and capabilities of science are still generally wanting, there have been of late signs that these matters are coming to engage the attention of those who guide the policy of the State.

Selling and Distributing Costs

Location of Excessive Expenditure

A WIDENING of the sphere which comes within the purview of costing application and an advance in the specialisation which grows even within this localised science is reflected in the papers concerning selling costs, read before the Third Conference of the Institute of Works and Cost Accountants recently. The movement has steadily been growing to supply the whole of industrial and commercial activities with costing methods, and the old practice of manufacturers simply to add a rough and ready percentage for commercial on costs is giving way to a scientific investigation of what constitutes the elements of distributing charges.

This is all to the good of business, for the common sense reason that savings effected by strict control over manufacturers may be dissipated by laxity in retailing. Moreover, production does not cease till the goods are placed in the hands of the consumers. Commercial men, engaged solely on the distributing side, will realise that the new efforts of cost accountants mean much.

To many business men the importance of commanding distributive selling costs is of burning importance, yet the question of selling costs has hitherto received but scanty attention. Literature on the subject is very general, so that this department may be referred to as the Cinderella of cost accounting. The high cost of distribution is an outstanding feature of modern commercial conditions and is a problem which has grown along with the development of commerce in this country. We have been so intent on the manufacturing aspect of industry that selling and distribution costs generally have been relegated to the background, but are now so important that it is no longer possible to ignore them. We are a people who must live principally by exports, and if this country is going to regain her position in world trade she must develop to an increasing extent her markets beyond the seas. This means that the problem of distributing costs is going to be one of still greater importance, and the time is now more than due when the matter should receive our most careful consideration and research. Several aspects of salesmanship have to be considered from the point of view of control, and important among these are: (1) The volume and nature of the sales obtained and (2) The cost of obtaining these sales. Methods of remunerating travellers and agents have made maximum sales their principal selling object, and the danger will always exist, where selling expense is uncontrolled, that a considerable portion of the sales figures are obtained at exorbitant cost.

A Sales-Bringer of Economy

On the other hand, with adequate costing research, judicious advertising, involving initial cost, would show in its true perspective as a sales-bringer of pre-eminent economy. The problem of allocations, with selling costs incurred, as between products, gives rise to much debate as to what is most appropriate to the individual distributor, but the warning must be uttered that the application of a uniform basis to all business would be singularly inaccurate. The present general practice is to segregate selling costs over a period and express the total as a percentage on the total sales for the same period. This method, though feeble, nevertheless is a progressive step and shows some recognition that special treatment of selling costs is necessary.

There are, as we know, orders which come in more or less automatically, upon which the actual counting-house expense is relatively small, and there are other orders which cost us so much to obtain that we gain little from them. As a piece of constructive criticism, it is suggested that the labour factor is the most convenient, if not the most correct, form of allocation for costs. The selling of goods necessarily involves distribution overhead and a fuller knowledge of these is a definite precursor to their reduction, and this latter course will be the indicator of the advancement of business in its service to the community.

This leads to the thought that those who pay the cost, and who are therefore most intimately concerned, are the general public. Costs which are too high must be detrimental to sound business, and costing practice needs always to have in mind the long view that its functions are able to stimulate demand by effecting lower prices to the consumer.

Reviews

DICTIONARY OF APPLIED CHEMISTRY. By Sir EDWARD THORPE, C.B., F.R.S., assisted by numerous experts. Vol. V. Pp. viii, 722. London: Longmans, Green and Co. 60s. net.

We have had to wait a long time for this, the fifth, volume of Sir Edward Thorpe's Dictionary, and now it has come we are set wondering how we have managed to solve some of our daily problems without it. It must be nearly eighteen months since its predecessor (which carried us up to "Oxydisilin") made its appearance, and it is, perhaps, only the regular user of Thorpe who appreciates that with a work such as this, which has necessarily to be issued volume by volume, the particular subject to which we want to refer always seems to be in the volumes yet unissued. Encouraging progress, however, is being made, and the present volume takes us up to the end of the "R's." From this it would seem that the whole work in its new form will require only one more volume, making six in all. This means that, when completed, the cost of the entire work will be £18, a sum which certainly bears no relation to the value of the information which is given, but which must be well beyond the pocket of many of those to whom it is indispensable. Fortunately, since the war many industrial undertakings have adopted the long-sighted course of establishing a library for their staffs, and in this instance it is clearly the duty of individual firms to shoulder the expense for the benefit of their technical workers.

In view of the fact that there must be many who still have, and make use of, the former edition of the Dictionary, it should be pointed out that the entire work has been carefully revised in the light of recent developments. Many new articles have been added, and certain of the former articles have been recast or wholly rewritten. Fine chemicals have received special attention, all the pharmacological articles have been revised, while alkaloids and synthetic drugs have been treated at greater length and much new matter relating to them has been added. More than forty specialists have contributed to Vol. V, among whom one notices in particular the names of Professor E. C. C. Baly, Dr. J. W. Mellor, Professor A. G. Perkin, and Sir William Tilden. A short article, but one full of interest, is that contributed by Professor G. G. Henderson on synthetic rubber. The writer reminds us that the demand for rubber brought about by war conditions and the shortage in Germany gave a great impetus to the production of synthetic rubber in that country, and a factory was erected capable of producing 200 tons annually of "methyl rubber" from dimethylbutadiene. The product was not wholly satisfactory at first, but it is now said that some of its objectionable qualities have in large part been removed by improvements in the manufacturing processes. Taking into account, however, possible improvements in the production of natural rubber, it seems more than doubtful whether the synthetic product can compete with it as regards price. It is generally agreed that unless synthetic material can be put on the market at 1s. 3d. per lb., there is little chance of the natural substance being superseded, and at the present time manufacture appears to have been entirely suspended.

In a particularly well-balanced survey, Dr. H. J. Bush has given what is probably the most complete information that has yet been put together in connection with that modern chemical engineering problem, electrical precipitation. Altogether the number of electrostatic recovery plants operating in various parts of the world now approaches 200, and these are employed in treating all manner of gases and materials suspended therein. It is instructive to note that in France a number of the leading sulphuric acid makers have adopted electrical precipitation for cleaning the sulphur dioxide gases from mechanical roasters, the type favoured being vertical cast-iron pipes with alloy steel wires suspended therein as discharge members. These installations are reported to be working successfully and are said to give efficiencies of 96 per cent. and over.

In dealing with so comprehensive a work as Thorpe it is almost impossible for a reviewer to do justice either to the contributors or himself. One cannot read a volume of this character from cover to cover. Dictionaries are made for no such purpose, and all that we require of them is that they should prove a reliable helpmeet when faced with problems not encountered in the customary daily round. The chemist, manufacturer, or chemical engineer who has the complete Thorpe at his elbow is equipped with a never-failing source of information which is as trustworthy as it is complete.

C. A.

CHEMICAL SYNTHESIS. By HARRY HEPWORTH, D.Sc., F.I.C. London: Blackie and Son, Ltd. 1924. Pp. xx., 243. 20s. net.

The sub-title of this volume describes the contents as being "studies in the investigation of natural organic products," and this disarms any criticism that may be levelled against it on the score of incompleteness. Indeed, the author in his preface expressly states that his book only partially covers quite a limited field concerning the achievements of the organic chemist in the domain of the natural organic compounds. After a short introduction, the author treats of the photosynthesis of plant-products, and does justice to the work of Moore and Webster, and of Baly, Heilbron and other workers. Chapter II. contains an account of modern work on plant colouring matters, after which follow chapters on carbohydrates; the depsides, lichen products and tannins; oils, fats and waxes; terpenes and derivatives; amino-acids and polypeptides; simple organic bases; pyrimidine and purine bases, and the alkaloids.

Where so much is good it is perhaps ungrateful to comment adversely on minor points, but as the author implies that his book is intended for organic research students, it should be pointed out that there is a little uncertainty here and there as to the precise meaning of his structural formulæ, especially in the alkaloid section. Thus in several places, the benzene ring is shown with and without double bonds, and the fact that in some ring formulæ the groups are CH—and in others CH_2—groups is not always indicated. On page 95 "coco-butter" (for "cocoa-butter") appears with the spelling that is now properly restricted to coco-nut products. On page 219 the formula given as that of *a*-ethyl-pyridyl-alkamine appears to be that of *a*-ethyl-piperidyl-alkamine. Formula (ii) at the bottom of page 220 is lacking in a hydrogen atom (NH). The volume, however, is full of good things well presented, and as an introduction to the larger manuals can be unreservedly recommended to research students and to all organic chemists. The book is produced in good style, and the printers are to be commended for the success achieved in a difficult piece of work. Portraits of four well-known organic chemists provide an interesting frontispiece to the volume.

A. R. T.

CHEMISTRY OF THE RARER ELEMENTS. By B. SMITH HOPKINS, Professor of Inorganic Chemistry, University of Illinois. D. C. Heath and Co., Boston, New York, Chicago and London. 1923. Pp. 376. 15s. net.

There has been of late such a deluge of chemical and physico-chemical literature, good, bad and—mostly—indifferent, that the reader is apt to be captious in approaching a new text book. It may, however, be said, without further preamble, that Professor Hopkins's new book on the Rarer Elements merits the warmest praise as an ideal text-book. Dealing simply and solely with the subject of his title, Professor Hopkins has very wisely refrained from extraneous matter, and has likewise resisted the current temptation to embark on what may be called speculative chemistry. The first chapter deals with the periodic system and is valuable as giving in diagrammatic form all the various arrangements of the elements which have been proposed before and after Mendeléeff, with the exception of the Langmuir table, which should, perhaps, have been included for the sake of completeness, but of which there is no mention. The chemistry of the rarer elements is then described by groups, commencing with helium. The book follows the standard arrangement of the older and better chemical text books, inasmuch as, after an historical account of the discovery of the element, its occurrence, separation, purification and properties are clearly and fully described. A section is devoted to the uses, and in all cases the compounds, if any, are given in full, in their natural sequence. The book is just what is required by those who, possessing a good, sound manual of chemistry, wish to supplement it with a volume bringing it up to date in respect of those newer elements respecting which most of the information is too recent to have been included in their stock text book.

L. P. S.

British Empire Exhibition: Chemical Notes

Continued Interest in the Chemical Section

ALTHOUGH the attendance at Wembley on the August Bank Holiday was only about half that of Whit Monday this fact must not be taken as indicative of any waning of interest in the exhibition. In fact, as we noted last week, there is apparently a much greater interest being taken in the serious exhibits; the Scientific Section of the Chemical Hall, for instance, seemed to be attracting a much greater number of visitors than previously. One of the features of the past two months has been numerous parties of excursionists from all parts of the country who felt they ought not to miss Wembley, and consequently the place was somewhat crowded with people who wanted to see it all in a day. Naturally this idea led in the course of an hour or two to a state of amazed vacancy and considerable fatigue. Now this phase seems to have passed and visitors at present mostly wish to investigate the exhibits and learn what they can about them. This, of course, is an enormous task, but it is much more to the exhibitors' interests than mere wandering and gaping. Wembley is thus being recognised as a place of education, and as interesting as such as its Amusements Park is diverting. It is largely because of its value in this direction that the idea is being developed for a re-opening next year. Nothing is as yet decided, but it is evident that given exhibits of a similar kind to those there this year there would be no doubt about the public support, but if the quality were inferior the result would hardly be so encouraging.

A New Idea in Leaflets

It has long been remarked that wherever an exhibitor had provided a selection of pamphlets or other removable literature on his stand, after the passing of a party of school-children the effect was similar to that of a swarm of locusts in a fertile land. Though school-children in parties are no longer visiting Wembley, they are still there as individuals and they have not thereby lost any of their acquisitiveness. It is a matter of wonder what interest some of the technical literature could have had for the young mind, but now a move has been made by one chemical concern, the British Dyestuffs Corporation, in supplying a special leaflet for children. This consists of some pictures, including a comic cat, printed in water-soluble dyes, which reveal their colours on being moistened with a brush, the dyes used being eosine, malachite green, methylene blue and Bismarck brown. With the title "Dolls in Dolly-land, or Painting Without Paints" the leaflet forms a subtle advertisement for British dyes which will find its way into the home and carry on publicity there for the firm in an effective manner.

The Vickers Exhibits

The name Vickers in the public mind is associated with battleships and armaments, but a visit to the exhibit in the Palace of Engineering at Wembley leaves the impression that there is little in the engineering line which is not made by Vickers and the associated companies. The exhibit is of about the same size as the smaller sections in the Palace of Industry. At the end of the stand the figures "Scientia" and "Vigore" testify to the associated forces which make industrial progress a possibility. Between the arches which support the roof panels show naval ships and merchantmen, while a picture, similarly situated, presents the features of the Barrow-in-Furness shipyard and works. This arched structure, so ably treated by the artist, gives a most happy division of the stand, and further sub-division is afforded by the use of distinctive badge signs in relief and titles on pillar supports.

A feature of the exhibit which makes a particularly pleasing appeal to visitors is the fine set of carillon bells which has been lent by the War Memorial Committee, Simcoe, Ontario, and when the exhibition terminates will be forwarded to Canada. The bells, 23 in number, are installed in the clock tower of the Vickers Research Building. Cast by the well known bell-founders, Gillett and Johnston, of Croydon, these bells have a remarkable sweetness and purity of tone, the notes being clear and melodious, and blending together with an unusually pleasing effect.

At one end of the exhibit is the Research Laboratory, which is equipped with many instruments devised for the measurement of minute physical actions, for the microscopic and spectroscopic examination of metals, and for ensuring that all constructions can be made true to size or, deviating from it, by only a fraction of a thousandth of an inch. The existence of this laboratory as an item in a firm's display of its activities must be accepted as testimony that Vickers appreciate the value of experimental work, while the exhibits within give evidence of the successful results achieved. A feature is the number of photographs showing the effect of tensile and other stresses on metals of various kinds, and also one or two special metals, such as Vickers Crown metal, which is a non-corrosive alloy of copper, nickel, and zinc. In another part of the exhibit "Vickers Duralumin" may be seen, this being an alloy with the tensile properties of mild steel and the lightness of aluminium, together with high resistance to corrosion. It is made by James Booth and Co. (1915), Ltd., of Nechells, Birmingham.

Chemical Engineering Interests

Many of the items in the Vickers Exhibit have a chemical engineering interest. Auxiliary machinery for ships which may be seen includes a particularly neat evaporator, known as the "Contraflow," which has coiled tubes of solid drawn copper. The "Contraflow" de-aerator is an example of a device which is at times of great advantage in water-tube boilers, considerably improving the steam-raising capacity and at the same time heating the feed water.

One of the most interesting exhibits is the new pump known as the "Pavic," in which the water is entrapped in the spaces between the squared sided threads of a large screw. The manner in which this is accomplished without making the screw travel along in the barrel, although the threads of the two engage, but are of different diameter, is exceedingly ingenious. Demonstrations with actual pumps erected on the stand show that they are suitable to work against high heads and to create large suction pressures. It seems possible that many uses not even contemplated at present, though their field of service is already recognised as great, may be found for these pumps, for they can deal with viscous and even grit-charged fluids without trouble.

For the removal of suspended impurities in oil or the separation of water from it, British Separators, Ltd., an associated company of Vickers, Ltd., introduced a centrifugal separator, known as the "Vicken." The oil or other substance —for its scope is great—is introduced into a bowl rotating at a very high speed. In it the heavy solids are deposited and the fluid is separated according to density. The heavier fluid goes to the outside of the bowl and is conducted away to a receiving trap. While that is in progress the lighter fluid near the centre of the rotating system passes through the spaces between a series of thin cones and up through perforations into another trap. By the use of suitable discharge openings for the outlets into the various traps, the separation of materials with small differences in density may be performed. The separation of water from oils can be readily obtained.

In connection with pulverised fuel developments on the stand, the Vickers and International Combustion Engineering Co., Ltd., show a working example of a Raymond Roller Pulveriser for this and other purposes. In this, the Lopulco, system, the coal is pulverised in a centralised plant and afterwards distributed to each of the boilers. This is the system on which attention has been concentrated, and it is shown by the lay-outs of plants for complete boiler installations.

The British Oxygen Co., Ltd.

The British Oxygen Co., Ltd., have an exhibit in the Palace of Engineering on stand 175 (avenue 1 and 2, bays 8 and 9), where there is a full range of the apparatus manufactured by the company. A special feature is the latest type of "Universal" oxy-coal-gas or oxy-acetylene metal cutting machine, which is worthy of special attention, with a variety of specimens for elliptical, circular work, longitudinal, bar cutting, etc., together with all the various types of hand metal cutters. Complete ranges of oxy-acetylene welding blowpipes, oxy-coal-gas lead-burning blowpipes, oxy-coal-gas brazing blowpipes, also "Endurance" regulators for all purposes and pressures in great variety are also included. High pressure valves for all types of cylinders and gas mains and high duty gas compressors of the latest type are also

shown, the largest being capable of compressing 4,000 cubic feet per hour to a maximum pressure of 2,000 lb. per square inch; all these machines are provided with forced lubrication to the working external parts, and the internal lubrication by water. All the goods exhibited on this stand are manufactured in the company's works at Angel Road, Upper Edmonton, where, by special arrangement, any of the machines mentioned can be seen in operation.

The Grasselli Agreement

ACCORDING to a Berlin journal the following is the correct version of the recent Grasselli agreement with the German Bayer concern: "The Grasselli Chemical Co., Cleveland, Ohio, has negotiated with the Farbenfabriken vorm. Friedrich Bayer, Leverkusen and Elberfeld, in order to form an association of both enterprises for the mutual use of trade marks and patents on the American market. According to our information the Grasselli company, which had acquired the Bayer branch factories in Albany and Paterson when these had to be sold, took the initiative because the question of legality as to the possession of trade mark protection and patent rights is generally not yet sufficiently cleared up. Grasselli, who then acquired with the Bayer branch plants the Bayer trade marks, patent rights and processes, especially on pharmaceutical preparations, has an interest in this association, by overcoming certain difficulties of a legal nature, as, for example, the use of the trade mark 'Mabyer.' The outlook for this is good. The report that Grasselli has already taken over the Bayer representation is not confirmed, and the report that the Bayer branch factories would be taken over by Grasselli on July 1 is also not correct, since they had to be sold long ago."

M.P.s Visit to Fuel Research Station

ON Thursday, July 31, a visit was made by a party of about thirty Members of Parliament representing mining constituencies to the Government Fuel Research Station at Greenwich. Dr. Lander, Director of Research, received the visitors, and explained to them the nature of the work carried on at the station. At present they were carrying on a survey of the coal seams of the whole country, from physical and chemical points of view, and they hoped with the new additional assistance provided by the Government to set up local committees for the purpose, in all coal districts, within eighteen months. Two such local committees had already been established. Another phase of their work was the investigation of the decarbonisation of coal. They wanted to determine how far it was possible to reduce the enormous quantities of coal now used in its raw state by replacing it with some more economical smokeless fuel which could be used both commercially and in the home, and which incidentally would lessen the pollution of the atmosphere. So far they had not succeeded there, but a great deal of work had been done. The party then proceeded to inspect the experimental plant at the station. Nearly two hours were spent in examining the various appliances.

Silica Gel Developments

IT has been announced in New York that the Silica Gel Foreign Petroleum Corporation has been formed to take over the refining of petroleum products by silica gel processes in all parts of the world outside the United States. The directors of the new company include Messrs. J. B. August, Kessler William, Carroll de Louw, and F. Godber representing Royal Dutch petroleum interests, and Messrs. C. Wilbur Miller, W. Newcomer, R. Garret, O. Hershey, and E. C. Miller representing the Silica Gel and Davison Chemical Companies' interests.

English Chemists at American Chemical Meeting

THE annual meeting of the American Chemical Society is to be held this year at Ithaca, N.Y., from September 8 to 13, when the Cornell University will act as hosts. There will be a full programme of addresses and visits to places of interest, the most notable feature of which is the inclusion of papers by Sir Max Muspratt on "Chemistry and Civilisation," and by Sir Robert Robertson on "The Chemistry of the Trinitrotoluenes."

Chemical Matters in Parliament

Dyestuffs

Mr. Graham White (House of Commons, July 29) asked the President of the Board of Trade if he could now make a statement with regard to the proposed agreement between the British Dyestuffs Corporation and the Interessen-Gemeinschaft; and if he had any information to the effect that the latter company was seeking to make a similar agreement with the French manufacturers of dyestuffs.

Mr. Webb said that he was not yet in a position to make any statement on the matter mentioned in the first part of the question. As regards the second part, it was understood that an arrangement was made some years ago between the Interessen-Gemeinschaft and certain French dye manufacturers, but he was not aware of any contemplated new arrangement.

Mr. White asked whether he was satisfied that an attempt had not been made to set up an international trust.

Mr. Webb said he thought that there was no question of a complete international trust. We had in this country independent producers who were not at all inefficient.

Methylated Spirit

Mr. Lorimer (House of Commons, July 30) asked the Under-Secretary of State for the Home Department whether, in view of the fact that the increase in the consumption of methylated spirits was enormous, he could not withdraw the Order that pyridine must be mixed with methylated spirits; it was very injurious to the industries which use methylated spirits.

Mr. Davies replied that he was very desirous of making methylated spirits as unpalatable as possible to those who are inclined to drink it.

Mr. Lorimer asked the Chancellor of the Exchequer if, as methylated spirit was extensively used in surgery, and was one of the best sterilisers of the skin and of instruments, it had been brought to his notice that the addition of the new denaturant, pyridine, had a harmful effect upon the skin of the hands of surgeons and the skin of patients; and if so, would he, in the interest of surgeons and patients, have the Order to add pyridine to methylated spirit removed?

Mr. Graham said that the question raised was at present under investigation.

Sugar Beet Subsidy

Mr. Philip Snowden (House of Commons, July 30) said he was glad to be able to inform the Committee of Supply that the Government had accepted the principle of Exchequer assistance for sugar beet. The question of Free Trade and Protection was not involved. The sugar beet factories in this country had already received assistance from previous Governments. The Government proposed there should be an excise duty of 9s. 9d. on the beet sugar manufactured in this country, and there would be a subsidy of 19s. 6d. per cwt. A crucial matter was to ensure a sufficient supply of beet at prices that would encourage the producers. The Government, therefore, would fix a subsidy at a figure which would enable the manufacturers to give a price for beet that would encourage the farmer to grow it. A period of ten years would be necessary, during which assistance would be required to enable the industry to get on its feet. The Government were assured that if the subsidy were granted six new factories would be started almost immediately.

Perfumery (Spirit Duty Rebate)

Mr. Lorimer (House of Commons, August 5) asked the Chancellor of the Exchequer if he would indicate on what basis his statement was made that it would cost the Exchequer £1,000,000 per annum to allow a rebate of one-half of the Excies Duty at present charged on spirit used in the manufacture of perfumery articles; and whether he was aware that the Customs and Excise authorities have stated that they have no figures upon which they can estimate the amount of such loss.

Mr. Snowden said no precise official statistics were available, because the spirit used was duty-paid and no longer under Revenue supervision. The figure given by him was the result of Departmental inquiries into the use of spirit in perfumery and the closely allied trade of essence.

Gretna Sales

Mr. Snowden (House of Commons, August 5) said that the Government has decided that no further sales shall take place until an opportunity is given for a thorough investigation as to whether it is possible to use any property for Government schemes.

From Week to Week

A NEW ANÆSTHETIC, known as somnifene, is now being used in a Paris hospital.

THE BOLTON STEEL WORKS of H. Bessemer and Co., Ltd., have closed down.

SIX NEW SUGAR BEET FACTORIES are to be erected, four during the coming autumn.

THE CHEMICAL LABORATORY at Louvain University has been completely destroyed by fire.

AMENDMENTS to the Polish Alcohol Monopoly Bill have been accepted by the Diet, which has now passed the measure.

A NEW FERTILISER containing 46 per cent. nitrogen has been produced in Germany, according to an official of the agricultural experimental station.

MR. V. G. GRAAE has resigned his directorship in Jurgens, Ltd., in view of his election as chairman and managing director of Maypole Dairy Co., Ltd.

SIR WILLIAM CLARE LEES, a director of the Bleachers' Association, has been appointed a member of the Committee of Inquiry on British Trade.

BY ARRANGEMENT the British Association Conference at Toronto will overlap with the International Conference on Mathematical and Physical Science.

WORKERS ENGAGED IN ARTIFICIAL SILK manufacture at Courtaulds, Ltd., have decided to give a week's notice unless a uniform 10 per cent. advance in wages is conceded.

A TENDER OF £5,397 by Bowes, Scott and Western, Ltd., for a water-softening and filtration plant for Great Marylebone Electricity Committee, has been recommended for acceptance.

MR. ANTHONY WHITE HAS RESIGNED from the boards of the Associated Portland Cement Manufacturers, Limited, the British Portland Cement Manufacturers, Limited, and their allied companies.

CHANCE BROS. AND CO., glass manufacturers, of Smethwick, have just celebrated their centenary. They are the first firm of window glass manufacturers in Great Britain to establish this record.

LORD BEARSTED HAS GIVEN £10,000 to Sheffield University to encourage study and research in the department of metallurgy. He was the founder and is the Chairman of the Shell Transport Company.

THE U.S. CUSTOMS APPEAL COURT has upheld the decision of the Board of General Appraisers in connection with certain dye imports that the American selling price is to be taken as a basis for tariff valuation.

MANCHESTER HAS APPOINTED a City Gas Examiner whose duty will be to make daily tests of the quality of the gas supplied to consumers in the city and to furnish periodical reports to the Corporation.

FOR STEALING £607 9s. 11d. while assisting with a new issue of shares of Lever Bros., Ltd., Port Sunlight, a clerk, Harold S. Green, was sentenced to six months' hard labour at Birkenhead County Police Court.

THE DUNNING SCHOLARSHIP, open on this occasion to prospective candidates for the degree of Ph.D., has been awarded to Mr. Laurence St. Clair Broughall, B.Sc., of University College, London, for research in physics.

AN ADVISORY CHEMIST in the faculty of agriculture is required by University College, Reading. Applicants, who must have a British University degree and agricultural experience, should obtain details from the Registrar.

MR. ARTHUR JOHN WALKER, B.A., of Queen's College, Oxford, has been elected by the General Board of the Faculties to a scholarship for research in physical science of £200 a year for two years to enable him to carry out research in organic chemistry.

THE AMERICAN PORTLAND CEMENT ASSOCIATION is to erect a bronze tablet in Leeds to the memory of Joseph Aspdin, a bricklayer of Leeds, who in 1842 patented a formula for a material which, when hardened, resembled a stone found on the Isle of Portland. This ultimately became the now famous Portland cement.

THE U.S. TREASURY DEPARTMENT has issued its third supplemental list of dye standards for the purpose of administering the coal-tar paragraph of the Tariff Act. The third list contains seven additional dyes for purposes of comparison and adds seven additional names of dyes corresponding to dyes already adapted as standards.

THE TASMANIAN GOVERNMENT has sold its interest in the carbide works at Electrona, North-West Bay, to the shareholders. The Government had advanced over £100,000 to aid the establishment of the industry, but a new company will be formed. It is understood that the production of carbide is now being carried on at a profit.

CLASSES FOR CLAY AND GLASS WORKERS are being formed at Stourbridge and Lye. Dr. H. B. Cronshaw, formerly of the Refractories Research Association, and county lecturer on clay and glass technology, is to be the lecturer, assisted by distinguished scientists. Activities at first will be restricted to scientific and practical work on refractories.

JOHNSON AND SONS MANUFACTURING CHEMISTS LTD., of London, have lodged a case against William T. MacLeester in the United States District Court, Philadelphia, for $20,000. He is alleged to have revealed to other companies a special process sold to Johnson and Sons for the manufacture of a chemical used largely in making cinematograph films

APPLICATIONS are invited for the post of Superintendent of the Chemical Research Department of the Department of Scientific and Industrial Research. Candidates should be distinguished in some branch of pure or applied chemistry. The Department is also about to appoint a few assistants to the research staff of the Fuel Research Station, East Greenwich. Particulars and application forms for both appointments can be obtained from the Department, 16, Old Queen Street, S.W.1.

PROFESSOR LEEBODY, Londonderry's analyst, in a report says: "The use of preparations of sulphurous acid and meat preservatives gives a fictitious amount of freshness to stale and possibly decomposed meat, and cannot but have effect upon the digestive system. A recent writer has even hinted that the reckless modern habit of preserving foods by the use of strong chemicals may not be unconnected with the alarming spread of cancer."

REPORTS FROM SASKATCHEWAN state that the Government is negotiating with private capital to undertake the commercial operation of the lignite briquetting plant near Estevan, on which the Federal and Provincial Governments have spent upwards of $500,000 in experimental investigation. Experiments have proved the possibility of successfully making briquettes from carbonised lignite and utilising the immense low-grade coal deposits of the Province.

A CLUB FOR FRENCH DYESTUFFS CHEMISTS is proposed by M. R. J. J. Cammell, president of the Union Syndicate des Fabricants Français de Matières Colorantes, for French chemists who had experience in German dyestuff and other chemical factories before the war. In this way their accumulated experience will not be lost to France, and the period of difficulty before the younger generation of chemists have acquired experience in French works will be tided over.

THE SOCIETY OF FRIENDS OF CHEMICAL DEFENCE, working in co-operation with the Soviet war authorities, has started a bacteriological war section. The Petrograd and Moscow bacteriological laboratories have made bombs filled with cholera and plague germs. A test of these bombs will take place shortly at a special station in the Astrakhan district. The Soviet Government has also instructed several famous bacteriologists to study the problem of applying bacteriology on a large scale to the conditions of modern warfare.

REPORTS FROM WARSAW state that the Polish Ministry of Commerce is conducting negotiations with a British controlled oil company for the lease to British interests of 10,000 hectares of Government lands near the Carpathian mountains, for exploitation. For this purpose a new company has been formed. According to information obtained from the Ministry, all the main points were agreed upon during a recent visit to London of M. Bartoszewicze, head of the oil department. A representative of the syndicate is expected to visit Warsaw in the near future to complete the transaction.

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Abstracts of Complete Specifications

218,347. HYPOSULPHUROUS ACID, PRODUCTION OF. A. Worsley, Mandeville House, Isleworth, Middlesex. Application date, February 3, 1923.

It is known that hyposulphurous acid may be obtained in the form of the zinc salt by treating an aqueous solution of sulphur dioxide with zinc, for the purpose of bleaching clay, bauxite, barytes, feldspar, etc. The solution thus obtained may contain only a low proportion of hyposulphurous acid and may also contain metal salts. In this invention, the hyposulphurous acid is obtained by reducing sulphurous acid with hydrogen produced electrolytically within the solution. Sulphur dioxide may be introduced continuously into the solution to obtain a concentrated solution, and the temperature is kept as low as possible owing to the instability of hyposulphurous acid, while the pressure is also increased above atmospheric. The electrolysis is carried out under non-oxidising conditions to avoid oxidation to sulphurous acid. A catalytic agent may also be added, such as platinum, or a salt of zinc, or a colloid such as gelatine. Lead electrodes are preferably employed, and the anode chamber may contain sulphurous acid or any other suitable electrolyte. When the hyposulphurous acid is to be used for bleaching purposes, it is produced in the presence of the substance to be treated, the latter being maintained close to the cathode and preferably in continuous agitation.

218,354. ELECTROSTATIC SEPARATION OF PARTICLES. South Metropolitan Gas Co., 709, Old Kent Road, London, S.E.15., Woodall, Duckham and Jones (1920), Ltd., 52, Grosvenor Gardens, London, S.W.1, and H. S. Hatfield, East London College, Mile End, London, E. Application date, March 3, 1923.

The apparatus is for separating substances in a finely divided condition, such as mixtures of coal and shale, or minerals from a finely ground ore. It is found that when such mixtures are brought into contact with insulating materials such as glass, slate, or glazed metal, in a space between two conductors connected to a high frequency, high voltage generator, some constituents such as shale tend to adhere to the insulating surface, but others do not. Such separation is found to be more effective if a very high frequency, *e.g.*, between 20,000 and 500,000 per second, is used, and in such case the applied voltage may be less. In the case of coal, the separation is effected in an inert gas to avoid risk of explosion. Apparatus for carrying out the process is described, in which the mixture is subjected to the electrostatic field while falling under the action of gravity.

218,385. TREATING LIQUOR ACCRUING FROM THE LIXIVIATION OF VEGETABLE MATTER. L. J. B. A. Colas and A. P. J. Colas, 78, Avenue de la Grande-Armée, Paris, and l'Alfa, Soc. Anon. pour la Fabrication des Pâtes de Cellulose, 124, Rue de la Boétie, Paris. Application date, April 4, 1923. Addition to 200,482.

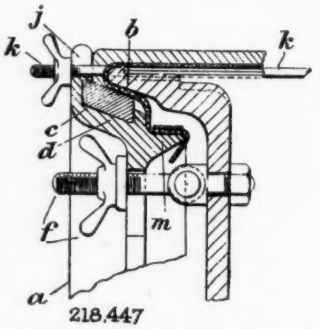
Specification No. 200,482 (see THE CHEMICAL AGE, Vol. IX, p. 290) describes the extraction of various substances from the black liquor obtained by the lixiviation of vegetable matter. The liquor was treated with an organic acid such as acetic or oxalic acid, and it has now been found to be advantageous to use calcium acetate to separate the suspended particles and flocculate the fine particles. The solid matter is separated by centrifuging, and is then treated with a solvent such as carbon tetrachloride or trichlorethylene to separate fatty or resinous substances. The material remaining may then be hydrolysed and fermented to obtain ethyl alcohol, or it may be destructively distilled.

218,414. NITRATION OF CELLULOSE. H. V. Walker, 191, Ballantine Parkway, Newark, N.J., U.S.A. Application date, April 17, 1923.

In this process, a succession of separate charges of mixed cotton and acids are passed through the apparatus and are gently agitated during their movement. The apparatus consists of a horizontal and rotating cylinder containing an internal helical partition of five turns, so that the lower part of the container is divided into a number of separate pockets. The charge is supplied to the first pocket, and the cylinder rotated one turn to transfer it one step forward and leave the first pocket ready to receive the next charge. The friction of the rotating walls of the helix agitates the mixture sufficiently to effect the nitration. The charge is finally delivered to a centrifugal extractor, and thence to a draining vessel. The helical partition is of a width less than half the diameter of the cylinder, so that a free central passage is provided for the fumes.

218,447. FILTERING APPARATUS. E. W. W. Keene, Holmer Mansions, South Road, Weston-super-Mare. Application date, May 24, 1923.

The filter cloth in a continuous rotary vacuum apparatus is usually secured on a drum by means of bands around its periphery. This involves the provision of new bands when changing



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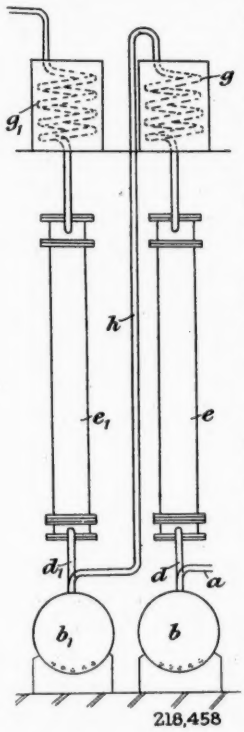
the filter cloth, and part of the cloth is rendered useless owing to the width of the bands. Further, it is difficult to stretch the filter cloth uniformly. In the present invention, *b* is a machined surface of the end plate of a drum, *a* is a ring having a machined surface *c* and provided with a packing ring *d*. The ring *a* is clamped to the drum by means of pivoted bolts *f* engaging in slots in the ring *a*. Clamping rods *k* may also be provided, passing through slots *j* in the ring *a*. The rods *k* are contained in longitudinal recesses in the periphery of the drum. The filter cloth *n* is passed over the outside edge of the drum and over the machined surface *b* of the end plate. The fiter cloth is held in position by clamping the ring *a* to the end plate by means of the bolts *f*.

218,544. CONCENTRATING LATEX AND SIMILAR MATERIALS, PROCESS AND APPARATUS FOR. General Rubber Co., 1790, Broadway, New York. Assignees of W. A. Gibbons and M. G. Shepard, 561, West 58th Street, New York, U.S.A. Application date, July 11, 1923.

In the application of rubber latex for various industrial purposes a higher concentration of rubber than the usual one-third in the natural latex is desirable, and the present invention provides means for concentrating latex up to 80-82 per cent. without coagulation. Water is evaporated from the latex by heating it, and passing a hot gas over the surface, which is continuously agitated to prevent the formation of a coagulated film. The temperature of the latex should be gradually reduced as the concentration increases. The latex is contained in a shallow vessel surrounded by a water jacket containing a perforated steam coil. The surface of the latex is stirred by rotating arms mounted on a vertical shaft, and hot air for evaporating the latex is supplied by a pipe which terminates just above the surface at the centre of the container. Premature coagulation is prevented by adding a small quantity of ammonia, the quantity being increased as the concentration increases. The water jacket may be heated to 90° C. initially, but the temperature is reduced when the concentration has increased to 60 per cent.—65 per cent. The temperature is gradually reduced until it reaches atmospheric temperature; when the concentration reaches 75 per cent. The speed of the stirrer should be about 50 revolutions per minute, to avoid splashing the latex and causing coagulation.

218,458. ALKYL-AMINES, PROCESS FOR SEPARATING FROM AMMONIA AND OTHER GASES. A. G. Green and H. F. Oxley, of Crumpsall Vale Chemical Works, Blackley, Manchester, and British Dyestuffs Corporation, Ltd., 70, Spring Gardens, Manchester. Application date, June 1, 1923.

In the production of methyl- or ethyl-amines by passing a mixture of the alcohol and ammonia over a catalyst, the resulting amines are mixed with the excess of ammonia and dimethyl-ether or ethylene. In the case of the ethyl-amines, the mono-, di-, and tri-amines are stronger bases than ammonia, and on heating with ammonium chloride and alcohol the corresponding ethyl-amine hydrochlorides are formed, but in the case of the methyl-amines only the mono- and di-amines act in this manner, and the tri-methyl-amine passes off with the ammonia and may be separated by compression and liquefaction. The mixture containing the three amines, water vapour, dimethyl-ether or ethylene, and alcohol is first passed through a vessel below a fractionating column and reflux condenser, and the water and alcohol remain in this vessel at boiling point. The gases are then passed through a pipe *a* into a vessel *b* in which the corresponding alcohol (methyl or ethyl) is boiled. The vapour passes through a pipe *d* to a tower *e* containing large crystals of ammonium chloride, on which the alcohol condenses. The amines are converted into their hydrochlorides, which are soluble in alcohol and pass into the vessel *b*. The gases pass through a reflux condenser *g*, and thence through a pipe *h* to a similar vessel b^1 containing boiling alcohol, and surmounted by a similar tower and condenser e^1, g^1, to convert the remaining amines into the hydrochlorides. From the alcoholic solution the mono-methyl-amine hydrochloride is crystallised out, and the residual liquid is evaporated to obtain the di-methyl-amine hydrochloride. The residual gases may be compressed and cooled to remove the trimethyl-amine and dimethyl ether and remaining ammonia, and then passed through the system again with fresh alcohol. In the case of the ethyl-amines the bases are liberated from the hydrochlorides and then fractionally distilled to separate them.



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218,542. ACRIDINIUM COMPOUNDS, PRODUCTION OF. R. B. Ransford, London. From L. Casella and Co., G.m.b.H., Frankfurt-on-Main, Germany. Application date, October 30, 1923.

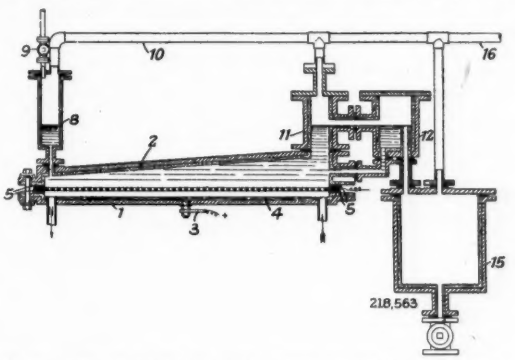
It is found that oxy-acridines can be alkylated in the acridine nitrogen without simultaneous alkylation in the hydroxyl group if alkylation is effected in the absence of acid binding agents. Alkoxy-acridines may similarly be transformed into acridinium compounds. Examples are given of the production of 3 : 6-dioxy-10-methyl-acridinium chloride, 3 : 6-dimethoxy-10-ethyl-acridinium chloride ; 3 : 6-dimethoxy-10-methyl-acridinium chloride, 3 : 6-dimethoxy-10-benzyl-acridinium chloride, and 3 : 6-dimethoxy-10-oxethyl-acridinium chloride. These compounds have high bactericidal properties.

218,568. AZO-DYESTUFFS, MANUFACTURE OF. A. G. Bloxam, London. From Chemische Fabrik Griesheim Elektron, Frankfurt-on-Main, Germany. Application date, December 13, 1923.

These azo-dyestuffs are obtained by combining any diazo compound with the bis- (2 : 3-oxy-naphthoyl)-4 : 4^1-diamino-3 : 3^1-dialkyl-oxy-diaryl. Suitable diazo compounds are aniline, its homologues and substitution products, such as toluidines, anisidines, chloro and nitro-anilines, chloro and nitro-toluidines, chloro and nitro-anisidines, naphthylamines, aminoanthraquinones, amino-azo bodies, and diamino bases. To obtain the bis- (2 : 3-oxy-naphthoyl)-4 : 4^1-diamino-3 : 3^1-dialkyloxy-diaryls, a 4 : 4^1-diamino-3 : 3^1-dialkyloxy-diaryl is treated with 2 : 3-oxynaphthoic acid in presence of a dehydrating agent. The bis- (2 : 3-oxynaphthoyl)-dianisidine is obtained from ortho-nitrotoluene, and the bis- (2 : 3-oxynaphthoyl)-diphenetidine from nitrobenzene. These dyestuffs yield orange to brown shades when produced on the fibre. A number of examples are given.

218,373, 218,563 and 218,606. ALKALI METALS, MANUFACTURE OF. T. Ewan, 86, Shuna Street, Maryhill, Glasgow. Application dates, April 3 and December 8, 1923.

218,373. Sodium is separated from a very dilute amalgam by using the amalgam as anode in the electrolysis of a solution of sodium cyanide in liquid anhydrous ammonia of any concentration, which can co-exist in equilibrium with a second liquid phase or layer of relatively larger sodium and smaller cyanide concentration. The layer which contains the sodium is drawn off. It is found that solutions of sodium cyanide in liquid anhydrous ammonia are of three kinds : (1) Those in which sodium is soluble ; (2) those in which sodium is insoluble or very slightly soluble, and with which it coexists in the form of a solution of sodium in ammonia free from salts ; (3) those in which sodium is insoluble, and with which it co-exists in the form of metal. When sodium cyanide is added to a solution of sodium in ammonia, a point is reached at which the solution separates into two layers, the lower consisting of a solution of sodium cyanide in ammonia and the upper consisting of a solution of sodium in ammonia. Further addition of sodium cyanide increases the concentration of the sodium solution until sodium separates out. The range of concentrations in which the two liquid phases are formed depends upon the temperature—*e.g.*, at —26° C. the range of sodium cyanide is from 3 per cent. to 44 per cent., and in the manufacture of sodium by electrolysing these solutions the best results are obtained between 28 per cent. and 41 per cent. of sodium cyanide. The sodium amalgam used is very dilute, and the anodic current density is 3-4 amperes per square centimetre for each 1 per cent. of sodium in the stationary amalgam ; higher current densities may be used if the amalgam is stirred. The temperature employed is preferably —30° C. to 30° C. Detailed examples are given of suitable solutions and current densities by which a solution of sodium in ammonia is obtained. This solution is then evaporated and the ammonia distilled off and condensed, leaving sodium in the evaporator mixed with about 2·7 per cent. of sodium cyanide, and a little sodium amide formed by catalysis.



218,563

218,563. A suitable apparatus for carrying out a process somewhat similar to the process described in Specification No. 218,373 above comprises a cast iron vessel 1 protected in its upper part by an ebonite lining 2. Current is supplied at 3 to the amalgam anode, and at 5 to a perforated steel cathode 4. Anhydrous liquid ammonia is supplied through a valve 9 to a vessel 8, and ammonia gas passes through a pipe 10 to the outlet 16. The upper liquid layer of alkali metal solution in ammonia collects in the vessel 11, and passes into vessel 12, and thence to vessel 15. Cooling jackets may be provided where necessary. This apparatus is for electrolysing sodium or potassium salts, such as the cyanide or iodide in liquid anhydrous ammonia with a dilute amalgam anode, to obtain sodium or potassium.

218,606. This process for separating sodium or potassium from very dilute amalgams by using the amalgam as anode in the electrolysis of a sodium or potassium salt is similar to that described in Specification No. 218,373, except that a solution of sodium or potassium iodide in liquid anhydrous ammonia is employed.

NOTE.—Abstracts of the following specifications which are now accepted, appeared in THE CHEMICAL AGE when they became open to inspection under the International Convention :—199,354 (Naugatuck Chemical Co.), relating to the manufacture of diphenylguanidine, see Vol. IX., p. 210; 199,721 (H. Pereira), relating to the manufacture of aminoparylene quinones, see Vol. IX., p. 237; 206,848 (G. Austerweil and L. Peufaillit), relating to production of *p*-cymene from monocyclic terpenes, see Vol. X., p. 73; 210,742 (L. Weil and Chemische Fabrik in Billwarder vorm. Hell F. Sthamer Akt.-Ges.), relating to production of pure anthracene and carbazol from crude anthracene, see Vol. X., p. 390; 214,572 (Appareils & Evaporateurs Kestner), relating to crystallisation processes, see Vol. X., p. 653; 214,576 and 214,579 (Elektro-Osmose Akt.-Ges.-Graf Schwerin Ges.), relating to electro osmotic purification of glycerin and gelatine, see Vol. X., p. 653.

International Specifications not yet Accepted

216,499. PERSULPHURIC ACID. Oesterreichische Chemische Werke Ges., 5, Technikerstrasse, Vienna. International Convention date, May 22, 1923.

To distil persulphuric acid, an alternating current of less than 1 ampere per square centimetre is passed through it and the pressure is reduced. The frequency may be 50 cycles per second with carbon electrodes, or more with platinum electrodes.

217,166 and 217,168. CELLULOSE SOLUTIONS. L. Lilienfeld, 1, Zeltgasse, Vienna. International Convention dates, June 5 and June 6, 1924.

217,166. Cellulose or a conversion product is treated with a strong organic base such as a quaternary ammonium base, or a base in the aqueous solution of which a highly electrolytically dissociated hydroxide is present, in the presence or absence of caustic alkali. Tetra-ethyl ammonium hydroxide, tetra-methyl ammonium hydroxide, phenyl trimethyl ammonium hydroxide, and guanidine are suitable bases. The cellulose material may be cellulose, comminuted or otherwise; products obtained by treating cellulose with oxidising or reducing agents; products obtained by heating cellulose alone or with water or glycerin, or with alkalis with or without salts, acids, bleaching or oxidising agents; products separated from solutions of cellulose or hydrocellulose in ammoniacal copper oxide, zinc halides, or strong mineral acids, oxycelluloses and other derivatives. The temperature of the reaction may be below 0° C., and in an example using guanidine, tetra-ethyl or methyl-ammonium hydroxide or phenylmethyl-ammonium hydroxide the temperature may be —8° to —11° C.

217,168. Cellulose conversion products are obtained by treating the initial material with strong sulphuric acid at a temperature preferably between —5° C. and 5° C., the proportion of sulphuric acid monohydrate being between 2 and 4 parts to each part of air-dried cellulose. The products are separated by mixing with a cooled solution of salt, acetic acid, benzenesulphuric acid or phenolsulphuric acid, or an alcohol. The product is then washed and dissolved in caustic alkali at —5° to —12° C. The solutions may be used in the manufacture of artificial silk, etc. The raw materials may be any of those mentioned in 217,166 above.

217,172. DEHYDRATING ALCOHOLS. Soc. Ricard, Allenet, et Cie, Melle, Deux Sèvres, France. International Convention date, June 7, 1923. Addition to 211,454. (See THE CHEMICAL AGE, Vol. X., p. 446.)

Specification 211,454 describes a process for distilling aqueous alcohol with another liquid which forms with alcohol and water an azeotropic mixture. In this invention, the added liquid is gasoline containing no constituents boiling below 80° C., the boiling points covering only a few degrees.

217,235. RECOVERING ALKALI FROM WASTE LIQUORS. E. L. Rinman, 14, Ymervägen, Djursholm, Sweden. International Convention date, June 6, 1923.

Waste alkali liquor from cellulose manufacture is evaporated and dry-distilled at 400° C. until only the more valuable constituents such as acetone, alcohol, and methyl ethyl detone are obtained. The residue is then cooled to 250°–300° C. by spraying water into the retort, and then crushed and granulated. This material is burnt in a rotary furnace at 750° C., when part of the lime becomes caustic, or if burnt as powdered fuel with preheated air at 1,000°–1,200° C. the whole of the lime becomes caustic. The burnt residue may be used for the preparation of caustic soda lye, and the lime sludge may be preheated to 300° C. by the gases from the burnt residue. The preheated calcium carbonate may be burnt with ordinary fuel to obtain lime.

LATEST NOTIFICATIONS

219,653. Manufacture of substantive azo dyestuffs. Soc. of Chemical Industry in Basle. July 27, 1923.

219,673. Manufacture of dyestuffs. Farbwerke vorm. Meister, Lucius and Brüning. July 23, 1923.

219,676. Manufacture of vanillin. Akt.-Ges. für Anilin-Fabrikation. July 28, 1923.

219,699. Production of phenols. Stinnes, Z. M. (Firm of). July 27, 1923.

Specifications Accepted with Date of Application

196,260. Alloy steel and iron, Manufacture of. B. D. Saklatwalla. April 15, 1922.

219,052. Hydrolysis in glue and gelatin manufacture, Method of. T. H. Lloyd. March 17, 1923.

219,059. Combustible materials, Preparation of. G. E. Holmes and Gas Light and Coke Co. March 26, 1923.

219,061. Siemens' open-hearth furnaces. W. A. Westwood. September 14, 1923.

219,089. Extraction and removal of resin from solution in acid, Apparatus for use in. Coke and Gas Ovens, Ltd. (C. Still, A. Ruhn, and P. Fritzschi.) April 18, 1923.

219,194. Clarification and decolorisation process for the manufacture of white sugar. J. J. Ragg. August 25, 1923.

219,236. Detecting or estimating and recording combustible constituents in gaseous mixtures. F. F. Uehling. December 12, 1923.

Applications for Patents

Anglo-Persian Oil Co., Ltd., and O'Brien, A. M. Refining mineral oils, etc. 18,424. August 1.

Australian Minerals Recovery Co., Ltd. Manufacture of sponge iron. 18,272. July 31. (Asutralia, September 15, 1923.)

Badische Anilin- and Soda-Fabrik and Johnson, J. Y. Synthetic manufacture of methanol. 18,106. July 29.

Bosshardt, E. Open-hearth furnaces. 18,184. July 30. (Germany, October 25, 1923.)

British Celanese, Ltd., and Ellis, G. H. Treatment of acetyl cellulose products. 17,958. July 28.

Butler, E. Anti-corrosion medium. 17,979. July 28.

Carpmael, W., and Farbenfabriken vorm. F. Bayer and Co. Preparation of sulphaminoazo bodies and of diazoazo compounds therefrom. 18,034. July 28.

Deutsche Gold-und Silber-Scheideanstalt vorm. Roessler and Liebknecht, O. Process for manufacture of a product containing hydrocyanic acid. 18,449. August 1.

Deutsche Gold-und Silber-Scheideanstalt vorm. Roessler and Liebknecht, O. Process for producing hydrocyanic acid. 18,450. August 1.

Farbwerke vorm. Meister, Lucius, and Brüning. Manufacture of condensation products of the anthraquinone series. 18,442. August 1. (Germany, August 8, 1923.)

Fierz, H. E. Manufacture of purified 1-nitro-2-methyl anthraquinone. 18,043. July 28.

Greenhalgh, E. Treatment of acetyl cellulose products. 17,958. July 28.

Jones, J. I. M., Morton Sundour Fabrics, Ltd., Morton, J., and Wylam, B. Dyes and dyeing. 18,232. July 30.

Meyerhofer, A. F. Process of producing hydrofluosilicic acid salts. 18,329. July 31. (Germany, December 20, 1923.)

Meyerhofer, A. F. Decomposing alkali salts into hydroxides or carbonates and acids. 18,330. July 31. (Germany, October 1, 1923.)

Meyerhofer, A. F. Production of metal compounds. 18,331. July 31. (Germany, December 20, 1923.)

Naamlooze Vennootschap Philips' Gloeilampenfabrieken. Process for separating hafnium and zirconium. 18,119. July 29. (Denmark, July 30, 1923.)

Schnetzer, K. Method of preventing adhesion of scale in boilers, etc. 18,333. July 31.

Silver Springs Bleaching and Dyeing Co., Ltd. Processes in which artificial silk, etc., is treated with hot liquors. 18,293. July 31.

Soc. of Chemical Industry in Basle. Manufacture of intermediate products. 18,440. August 1. (Switzerland, August 9, 1923.)

Soc. of Chemical Industry in Basle. Manufacture of dyestuffs. 18,441. August 1. (Switzerland, August 11, 1923.)

Trepel, M. B. Method of utilising vitriolic sludges obtained from refining of hydrocarbons. 18,199. July 30.

London Chemical Market

The following notes on the London Chemical Market are specially supplied to* THE CHEMICAL AGE *by Messrs. R. W. Greeff & Co., Ltd., and Messrs. Chas. Page & Co., Ltd., and may be accepted as representing those firms' independent and impartial opinions.

London, August 7, 1924.

OWING to the holidays there is little to report since our last issue, and prices remain more or less the same as last reported.

General Chemicals

ACETONE.—Has been in steady request, and no alteration in price is recorded.

ACID ACETIC.—Is easier, and only in very small demand. Technical, £43 per ton, carriage paid; pure, £43 per ton, ex wharf.

ACID CITRIC.—Dull, with no change in price at 1s. 5½d. to 1s. 6d., less 5%.

ACID FORMIC.—Is in better request, but price shows no improvement. 85% is quoted at £54 10s. to £55 10s., carriage paid.

ACID LACTIC.—Shows no change and price is steady at £37 to £39 per ton, for 50% volume.

ACID OXALIC.—A shade firmer, with a better demand. Spot price is maintained at 4½d. per lb., ex wharf.

ACID TARTARIC.—In steady request, with English make offering at 1s. 1½d., less 5%, and foreign slightly cheaper.

ARSENIC.—Shows no activity, price remains around £45 per ton.

BARIUM CHLORIDE.—In much better demand and price firmer at £14 10s. to £14 15s.

COPPER SULPHATE.—In little request.

CREAM OF TARTAR.—Is easy, although price is still in the vicinity of 81s. 6d. per cwt., less 2½%.

CALCIUM CHLORIDE.—Firmer.

EPSOM SALTS.—A large amount of inquiry is being received and price shows no change at £4 15s. to £5 per ton.

FORMALDEHYDE.—Is still in very poor demand, spot stocks on offer at £53 to £54 per ton.

LEAD ACETATE.—Is in good request at £46 10s. to £47.

LIME ACETATE.—No improvement is shown and price is easy.

POTASSIUM CARBONATE AND CAUSTIC.—Only in small request.

POTASSIUM PRUSSIATE.—Is in much better demand and price is firmer. Spot price maintained at 7½d. per lb.

SODIUM ACETATE.—Without change at £24 per ton.

SODIUM HYPOSULPHITE.—In fair request at £9 15s. to £10 per ton.

SODIUM NITRITE.—Fair inquiry is being received and price is quoted at £26 to £26 10s. per ton.

SODIUM PRUSSIATE.—Inquiry has been better, although price has not changed, from 4d. to 4¼d.

SODIUM SULPHIDE.—In steady request for export, price without change at £14 per ton.

Coal Tar Products

The market generally for coal tar products is very quiet, and there is little fresh business passing.

90% BENZOL.—Is stationary at 1s. 6d. to 1s. 6½d. per gallon on rails.

PURE BENZOL.—Remains unchanged at 1s. 11d. per gallon on rails.

CREOSOTE OIL is quoted at 5¾d. to 6d. per gallon on rails in the North, and at 6¼d. to 6¾d. per gallon in London.

CRESYLIC ACID continues to be very quiet, the 97/99% quality being quoted at 2s. to 2s. 0½d. per gallon, f.o.r., while the dark quality 95/97% is worth 1s. 9d. per gallon on rails.

SOLVENT NAPHTHA remains steady at 11½d. to 1s. per gallon on rails.

HEAVY NAPHTHA is quoted at 1s. to 1s. 1d. per gallon on rails.

NAPHTHALENE continues in poor demand, no alteration in price being evident. The 76/78 quality is quoted at about £7 to £7 10s. per ton, 74/76 melting point at about £6 per ton, and the low grades at £4 10s. to £5 per ton.

PITCH.—Remains dull, the demand is very small; prices are unchanged.

Sulphate of Ammonia

SULPHATE OF AMMONIA.—There is a good inquiry for export and prices are well maintained.

Nitrogen Products Market

SINCE our report last week on the position of the nitrogen market there has been no alteration in the prices for export to Spain or Canary Islands. The f.o.b. value for shipment to the Colonies remains firm at £13 to £13 5s. per ton.

The demand for home agricultural use is normal for this period of the year.

With regard to nitrate of soda, the market is unchanged, the prices for spot delivery being £11 10s. to £12 per ton, c.i.f. chief European ports.

Position of the German Dyestuffs Industry

THE desire of the German Dye Cartel to enter into agreements with dye makers in other countries, to buy out interests, or to start factories abroad, is shown in a report by the secretary of the Chemical Division of the American Bureau of Commerce to be due to the position of Germany's dye industry at present as contrasted with pre-war days. In 1913 it was estimated that Germany controlled 75 per cent. of the world trade, and the approximately 13 per cent. of dyes manufactured by competitors were evolved from German intermediates, which indicated a virtual control of 88 per cent. of the world's consumption. Although the production facilities of the Cartel have been increased approximately 25 per cent. over those of the pre-war years, yet production in the post-war peak year, 1922, was only two-thirds that of the estimated pre-war peak of 1913. This was due to the effort of other countries to become independent of dyes from Germany, and the success attained by the United States in supplying 93½ per cent. of her own requirements, England 80 per cent., and France, Italy and Japan 40 to 50 per cent., besides increased production by Switzerland. As now constituted, Germany is not wholly self-sufficient and must necessarily look to the rest of the world more and more for essentials since expansion within the Cartel is controlled by the natural resources of Germany. In order to justify production on a large scale, Germany is working out new uses, utilising by-products, and fostering trade-mark and industrial specialities, this latter field having been tremendously expanded, as evidenced by the fact that to-day the Cartel not only produces all dyestuffs used in Germany, but also heavy chemicals, fertilisers, specialty products and over 50 per cent. of the pharmaceuticals.

Novel Dye Testing Device

THE United States Consul at Frankfort has announced that a new apparatus for testing the fastness of colours has been constructed at Hanau, in Germany. The fading of colours being chiefly due to the action of actinic ultra-violet rays, the lamp is designed mainly to produce these in great volume, and it therefore consists of a powerful mercury vapour lamp with a quartz glass tube.

Tariff Changes

AUSTRALIA.—A dumping duty has been imposed on permanganate of potash B.P. originated in, or exported from, Czechoslovakia.

GOLD COAST.—Proposed legislation will impose restrictions on the importation, transit and storage of petroleum.

Weekly Prices of British Chemical Products

The prices and comments given below respecting British chemical products are based on direct information supplied by the British manufacturers concerned. Unless otherwise qualified, the figures quoted apply to fair quantities, net and naked at sellers' works.

General Heavy Chemicals

All grades of Boric Acid have been reduced by £3 per ton as from June 11. Borax prices remain unchanged. Prices remain generally steady.

Acid Acetic 40% Tech.—£23 10s. per ton.
Acid Boric, Commercial.—Crystal, £45 per ton. Powder, £47 per ton
Acid Hydrochloric.—3s. 9d. to 6s. per carboy d/d., according to purity, strength and locality.
Acid Nitric 80° Tw.—£21 10s. to £27 per ton, makers' works, according to district and quality.
Acid Sulphuric.—Average National prices f.o.r. makers' works, with slight variations up and down owing to local considerations: 140° Tw., Crude Acid, 65s. per ton. 168° Tw., Arsenical, £5 10s. per ton. 168° Tw., Non-arsenical, £6 15s. per ton.
Ammonia Alkali.—£6 15s. per ton f.o.r. Special terms for contracts.
Bleaching Powder.—Spot, £11 d/d.; Contract, £10 d/d. 4 ton lots.
Bisulphite of Lime.—£7 per ton, packages extra.
Borax, Commercial.—Crystal, £25 per ton. Powder, £26 per ton. (Packed in 2-cwt. bags, carriage paid any station in Great Britain.)
Calcium Chloride.—£5 17s. 6d. per ton d/d.
Methylated Spirit 64 O.P.—Industrial, 3s. 1d. to 3s. 5d. per gall. Mineralised, 4s. 2d. to 4s. 6d. per gall., in each case according to quantity.
Potash Caustic.—£30 to £33 per ton.
Potassium Bichromate.—5½d. per lb.
Potassium Chlorate.—3d. to 4d. per lb.
Salammoniac.—£32 per ton d/d.
Salt Cake.—£3 10s. per ton d/d.
Soda Caustic, Solid.—Spot lots delivered, £16 7s. 6d. to £19 7s. 6d. per ton, according to strength; 20s. less for contracts.
Soda Crystals.—£5 5s. to £5 10s. per ton ex railway depots or ports.
Sodium Acetate 97/98%.—£24 per ton.
Sodium Bicarbonate.—£10 10s. per ton carr. paid.
Sodium Bichromate.—4½d. per lb.
Sodium Bisulphite Powder 60/62%.—£18 to £19 per ton according to quantity, f.o.b., 1-cwt. iron drums included.
Sodium Chlorate.—3d. per lb.
Sodium Nitrate refined 96%.—£13 5s. to £13 10s. per ton, ex Liverpool. Nominal.
Sodium Nitrite 100% basis.—£27 per ton d/d.
Sodium Sulphide conc. 60/65.—About £14 10s. per ton d/d.
Sodium Sulphide Crystals.—£9 per ton d/d.
Sodium Sulphite, Pea Crystals.—£15 per ton f.o.r. London, 1-cwt. kegs included.

Coal Tar Products

Prices in this section show some irregularity, according to district. In the north-eastern counties, for instance, anthracene oil, solvent naphtha, and naphthalenes are cheaper than in Lancashire or London. On the other hand, crude carbolic and creosote are dearer.

Acid Carbolic Crystals.—6½d. to 6¾d. per lb. Quiet. Crude 60's, 1s. 9d. to 1s. 11d. per gall., according to district. Still quiet.
Acid Cresylic 97/99.—2s. 1d. to 2s. 2d. per gall. Demand still good. Market firm. Pale 95%, 1s. 10d. to 1s. 11d. per gall. Steady demand. Dark, 1s. 10d. to 1s. 11d. per gall. Steady business.
Anthracene Paste 40%.—4d. per unit per cwt. Nominal price. No business.
Anthracene Oil, Strained.—8½d. to 9½d. per gall. Quiet. Unstrained, 7½d. to 8½d. per gall.
Benzol.—Crude 65's.—10½d. to 1s. per gall., ex works in tank wagons. Standard Motor, 1s. 4½d. to 1s. 6d. per gall., ex works in tank wagons. Pure, 1s. 8½d. to 1s. 10d. per gall., ex works in tank wagons.
Toluol.—90%, 1s. 5½d. per gall. Pure, 1s. 8d. to 2s. per gall.
Xylol Commercial.—2s. 3d. per gall. Pure, 3s. 3d. per gall.
Creosote.—Cresylic, 20/24%, 9d. to 9½d. per gall. Few inquiries. Middle Oil, Heavy, 5½d. to 6d. per gall. in Lancashire. Standard specification, 6d. to 7d. per gall. in Yorkshire.
Naphtha.—Crude, 8d. to 9d. per gall. Solvent 90/160, 1s. 1d. to 1s. 4d. per gall., according to district. Quiet. Solvent 90/190, 1s. 1d. to 1s. 4d. per gall. Quiet.
Naphthalene Crude.—Drained Creosote Salts, £4 to £6 10s. per ton. Quiet. Whizzed or hot pressed, £9 per ton. Little business.
Naphthalene.—Crystals and Flaked, £13 to £16 per ton in Yorkshire and London respectively. More inquiries.
Pitch.—Medium soft, 55s. to 60s. per ton, f.a.s. for next season. Frequent inquiries.
Pyridine.—90/160, 19s. per gall. Market less firm. Heavy, 12s. to 12s. 6d. Little business.

Intermediates and Dyes

There has been a fair demand for dyestuffs during the past week. Prices remain constant. A number of intermediate products have been reduced in price.

In the following list of Intermediates delivered prices include packages except where otherwise stated.

Acetic Anhydride 95%.—1s. 7d. per lb.
Acid H.—4s. per lb. 100% basis d/d.
Acid Naphthionic.—2s. 4d. per lb. 100% basis d/d.
Acid Neville and Winther.—5s. 8d. per lb. 100% basis d/d.
Acid Salicylic, technical.—1s. 1d. per lb. Improved demand.
Acid Sulphanilic.—9½d. per lb. 100% basis d/d.
Aluminium Chloride, anhydrous.—1s. per lb. d/d.
Aniline Oil.—7¾d. to 8¼d. per lb. naked at works.
Aniline Salts.—7¾d. to 9d. per lb. naked at works.
Antimony Pentachloride.—1s. per lb. d/d.
Benzidine Base.—4s. 6d. per lb. 100% basis d/d.
Benzyl Chloride 95%.—1s. 1d. per lb.
p-Chlorphenol.—4s. 3d. per lb. d/d.
p-Chloraniline.—3s. per lb. 100% basis.
o-Cresol 19/31° C.—4½d. per lb. Demand steady.
m-Cresol 98/100%.—2s. 1d. to 2s. 3d. per lb. Demand moderate.
p-Cresol 32/34° C.—2s. 1d. to 2s. 3d. per lb. Demand moderate.
Dichloraniline.—2s. 3d. to 3s. per lb.
Dichloraniline S. Acid.—2s. 6d. per lb. 100% basis.
p-Dichlorbenzol.—£85 per ton.
Diethylaniline.—4s. 7d. per lb. d/d., packages extra, returnable.
Dimethyaniline.—2s. 4d. per lb. d/d. Drums extra.
Dinitrobenzene.—9d. per lb. naked at works.
Dinitrochlorbenzol.—£84 10s. per ton d/d.
Dinitrotoluene.—48/50° C. 8d. to 9d. per lb. naked at works. 66/68° C. 1s. 2d. per lb. naked at works.
Diphenylaniline.—2s. 11d. per lb. d/d.
Monochlorbenzol.—£63 per ton.
B-Naphthol.—1s. 1d. per lb. d/d.
a-Naphthylamine.—1s. 4½d. per lb. d/d.
B-Naphthylamine.—4s. per lb. d/d.
m-Nitraniline.—5s. 3d. per lb. d/d.
p-Nitraniline.—2s. 3½d. per lb. d/d.
Nitrobenzene.—5¼d. to 5½d. per lb. naked at works.
o-Nitrochlorbenzol.—2s. per lb. 100% basis d/d.
Nitronapthalene.—11d. per lb. d/d.
p-Nitrophenol.—1s. 9d. per lb. 100 % basis d/d.
p-Nitro-*o*-amido-phenol.—4s. 6d. per lb. 100% basis.
m-Phenylene Diamine.—4s. per lb. d/d.
p-Phenylene Diamine.—10s. 3d. per lb. 100% basis d/d.
R. Salt.—2s. 6d. per lb. 100% basis d/d.
Sodium Naphthionate.—2s. 3d. per lb. 100% basis d/d.
o-Toluidine.—8½d. per lb.
p-Toluidine.—3s. 6d. per lb. naked at works.
m-Toluylene Diamine.—4s. 3d. per lb. d/d.

Wood Distillation Products

All prices keep fairly stable, but there is room for improvement in business.

Acetate of Lime.—Brown, £14 10s. per ton d/d. Demand active. Grey, £19 to £20 per ton. Fair demand. Liquor, 9d. per gall. 32° Tw.
Charcoal.—£7 5s. to £9 per ton, according to grade and locality. Demand below normal.
Iron Liquor.—1s. 7d. per gall. 32° Tw. 1s. 2d. per gall. 24° Tw.
Red Liquor.—10d. to 1s. per gall. 14/15° Tw.
Wood Creosote.—2s. 7d. per gall. Unrefined.
Wood Naphtha, Miscible.—5s. per gall. 60% O.P. Market dull. Solvent, 5s. 6d. per gall. 40% O.P. Fairly good demand.
Wood Tar.—£5 per ton.
Brown Sugar of Lead.—£46 per ton.

Rubber Chemicals

Antimony Sulphide.—Golden, 5¾d. to 1s. 4d. per lb., according to quality. Crimson, 1s. 3d. to 1s. 6d. per lb., according to quality.
Arsenic Sulphide, Yellow.—1s. 11d. per lb.
Barytes.—£3 10s. to £6 15s. per ton, according to quality.
Cadmium Sulphide.—3s. 9d. per lb.
Carbon Bisulphide.—£24 to £26 per ton, according to quantity
Carbon Black.—7d. per lb., ex-wharf. Dearer.
Carbon Tetrachloride.—£56 per ton, drums free.
Chromium Oxide, Green.—1s. 3d. per lb.
Indiarubber Substitutes, White and Dark.—4¾d. to 6¼d. per lb. Demand very brisk. Prices likely to remain steady owing to firmness of rapeseed oils.
Lamp Black.—45s. per cwt., barrels free.

Lead Hyposulphite.—7½d. per lb.
Lithopone, 30%.—£22 10s. per ton.
Mineral Rubber "Rubpron."—£15 10s. per ton f.o.r. London.
Sulphur.—£10 to £12 per ton, according to quality.
Sulphur Chloride.—3d. per lb., carboys extra.
Thiocarbanilide.—2s. 6d. per lb.
Vermilion, Pale or Deep.—4s. 10d. per lb.
Zinc Sulphide.—7½d. to 1s. 8d. per lb., according to quality.

Pharmaceutical and Photographic Chemicals

The demand for Pharmaceutical Chemicals is better for export to the British Dominions than for the Home Trade.

Acid, Acetic 80% B.P.—£45 per ton.
Acid, Acetyl Salicylic.—3s. 2d. to 3s. 5d. according to quality. Good demand. Price firm.
Acid, Benzoic B.P.—3s. 6d. per lb. Larger supplies available.
Acid, Boric B.P.—Crystal £51 per ton, Powder £55 per ton. Carriage paid any station in Great Britain.
Acid, Camphoric.—19s. to 21s. per lb.
Acid, Citric.—1s. 5¾d. per lb., less 5% for ton lots. Business subnormal.
Acid, Gallic.—3s. per lb. for pure crystal.
Acid, Pyrogallic, Crystals.—7s. per lb. for 1 cwt. lots. Market firm.
Acid, Salicylic.—1s. 6d. to 1s. 8d. per lb. Low prices have stimulated more inquiry.
Acid, Tannic B.P.—3s. per lb. Market quiet.
Acid, Tartaric.—1s. 1¾d. per lb., less 5%.
Amidol.—9s. per lb. d/d.
Acetanilide.—2s. 1d. to 2s. 3d. per lb. for quantity. Demand slow.
Amidopyrin.—13s. 3d. per lb. Neglected. Stocks low.
Ammonium Benzoate.—3s. 3d. to 3s. 6d. per lb. according to quantity.
Ammonium Carbonate B.P.—£37 per ton.
Atropine Sulphate.—12s. 6d. per oz. for English make.
Barbitone.—15s. to 15s. 6d. per lb. Quiet market.
Benzonaphthol.—5s. 3d. per lb. Small inquiry.
Bismuth Salts.—A steady market. Prices according to quantity.
Bismuth Carbonate.—12s. 9d. to 14s. 9d. per lb.
Bismuth Citrate.—11s. 4d. to 13s. 4d. per lb.
Bismuth Salicylate.—10s. 2d. to 12s. 2d. per lb.
Bismuth Subnitrate.—10s. 9d. to 12s. 9d. per lb.
Borax B.P.—Crystal £29, Powder £30 per ton. Carriage paid any station in Great Britain.
Bromides.—Potassium, 10d. per lb.; sodium, 11d. per lb.; ammonium, 1s. per lb. Unsettled. Spot supplies short, raw materials dearer, market advancing.
Calcium Lactate.—Demand active. Good English make can be had from 1s. 7d. to 2s. 6d. per lb.
Chloral Hydrate.—4s. to 4s. 3d. per lb. Very firm and scarce.
Chloroform.—2s. per lb. for cwt. lots. Very steady.
Creosote Carbonate.—6s. 6d. per lb. Little demand.
Formaldehyde.—£54 per ton, ex works. English make in casks. About 8s. per cwt. extra for carboys.
Glycerophosphates.—Fair business passing. Calcium, soluble and citrate free, 7s. per lb.; iron, 8s. 9d. per lb.; magnesium, 9s. per lb.; potassium, 50%, 3s. 6d. per lb.; sodium, 50%, 2s. 6d. per lb.
Guaiacol Carbonate.—10s. 6d. to 11s. 3d. per lb.
Hexamine.—3s. 6d. per lb. for English make. Market quiet and steady.
Homatropine Hydrobromide.—30s. per oz.
Hydrastine Hydrochloride.—English make offered at 120s. per oz.
Hydroquinone.—4s. 3d. per lb. in cwt. lots. Foreign make.
Hypophosphites.—Calcium, 3s. 6d. per lb. for 28 lb. lots; potassium, 4s. 1d. per lb.; sodium, 4s. per lb.
Iron Ammonium Citrate B.P.—2s. 1d. to 2s. 5d. per lb., according to quantity.
Magnesium Carbonate.—Light Commercial, £36 per ton net.
Magnesium Oxide.—Light Commercial, £75 per ton, less 2½%; Heavy Commercial, £26 per ton, less 2½%; Heavy Pure, 1s. 6d. to 2s. per lb., according to quantity. Steady market.
Menthol.—A.B.R. recrystallised B.P., 50s. per lb. Market better. Synthetic, 26s. to 35s. per lb., according to quantity. English make. Strong demand.
Mercurials.—Market flat. Red oxide, 5s. 3d. to 5s. 4d. per lb.; Corrosive sublimate, 3s. 6d. to 3s. 7d. per lb.; white precipitate, 4s. 7d. to 4s. 8d. per lb.; Calomel, 3s. 11d. to 4s. per lb.
Methyl Salicylate.—1s. 10d. to 2s. per lb. for carboys. Keen competition.
Methyl Sulphonel.—26s. per lb.
Metol.—11s. per lb. British make.
Morphine and Salts.—Reduced by 1s. to 1s. 3d. per oz.
Paraformaldehyde.—2s. 10½d. to 3s. per lb. Not very active.
Paraldehyde.—1s. 5d. to 1s. 6d. per lb. in free bottles and cases.
Phenacetin.—6s. to 6s. 3d. per lb. Price and demand steady.
Phenazone.—7s. 6d. A shade firmer. Forward prices higher.
Phenolphthalein.—6s. 6d. per lb. Ample supplies.
Potassium Bitartrate 99/100% (Cream of Tartar).—88s. per cwt. less 2½% for ton lots. Firm market. Prices have upward tendency.
Potassium Citrate.—1s. 10d. to 2s. 2d. per lb. Dearer.
Potassium Iodide.—16s. 8d. to 17s. 5d. per lb., according to quantity. Demand continues heavy.
Potassium Metabisulphite.—7½d. per lb., 1-cwt. kegs included.
Potassium Permanganate.—B.P. crystals, 6½d. per lb., carriage paid; commercial, 8d. to 8½d. per lb., carriage paid. Keen competition keeps prices low.
Quinine Sulphate.—2s. 3d. per oz., in 100 oz. tins. Very heavy demand.
Resorcin.—5s. 6d. to 5s. 9d. per lb. Firmer. Scarce.
Saccharin.—63s. per lb. in 50-lb. lots.
Salol.—3s. 6d. to 3s. 11d. per lb.
Silver Proteinate.—9s. 6d. per lb.
Sodium Benzoate, B.P.—2s. 9d. per lb. Ample supplies B.P. quality available.
Sodium Citrate, B.P.C., 1923.—1s. 11d. to 2s. 2d. per lb., according to quantity.
Sodium Hypophosphite, Photographic.—£13 to £15 per ton. according to quantity, d/d. consignee's station in 1-cwt. kegs.
Sodium Metabisulphite Crystals.—37s. 6d. to 60s. per cwt., net cash, according to quantity.
Sodium Nitroprusside.—16s. per lb. Less for quantity.
Sodium Potassium Tartrate (Rochelle Salt).—75s. to 82s. 6d. per cwt., according to quantity. Market steady, good demand.
Sodium Salicylate.—Powder, 2s. 2d. to 2s. 4d. per lb. Crystal, 2s. 4d. to 2s. 6d. per lb. Flake, 2s. 9d. lb. Market more active.
Sodium Sulphide, pure recrystallised.—10d. to 1s. 2d. per lb., according to quantity.
Sodium Sulphite, anhydrous, £27 10s. to £28 10s. per ton, according to quantity, 1 cwt. kegs included. In large casks £1 per ton less.
Thymol.—19s. per lb. Very scarce indeed.

Perfumery Chemicals

Acetophenone.—12s. 6d. per lb.
Aubepine.—15s. 3d. per lb. Advanced.
Amyl Acetate.—2s. 9d. per lb.
Amyl Butyrate.—6s. 9d. per lb.
Amyl Salicylate.—3s. 3d. per lb.
Anethol (M.P. 21/22° C.).—4s. 6d. per lb.
Benzyl Acetate from Chlorine-free Benzyl Alcohol.—2s. 10½d. per lb.
Benzyl Alcohol free from Chlorine.—2s. 10½d. per lb.
Benzaldehyde free from Chlorine.—3s. 6d. per lb.
Benzyl Benzoate.—3s. 6d. per lb.
Cinnamic Aldehyde Natural.—16s. per lb. Advanced.
Coumarin.—20s. per lb.
Citronellol.—17s. per lb. Again advanced.
Citral.—9s. to 9s. 6d. per lb. Price reduction due to selling competition.
Ethyl Cinnamate.—13s. 6d. per lb. Cheaper.
Ethyl Phthalate.—3s. 3d. per lb.
Eugenol.—11s. per lb. Advanced.
Geraniol (Palmarosa).—35s. per lb.
Geraniol.—11s. to 18s. 6d. per lb.
Heliotropine.—7s. 9d. per lb. Advanced.
Iso Eugenol.—15s. 9d. per lb.
Linalol ex Bois de Rose.—26s. per lb.
Linalyl Acetate.—26s. per lb.
Methyl Anthranilate.—9s. 6d. per lb.
Methyl Benzoate.—6s. per lb.
Musk Ambrette.—45s. per lb. Cheaper.
Musk Xylol.—14s. per lb. Again cheaper.
Nerolin.—4s. 9d. per lb. Advanced.
Phenyl Ethyl Acetate.—15s. per lb. Advanced.
Phenyl Ethyl Alcohol.—16s. per lb.
Rhodinol.—57s. 6d. per lb.
Safrol.—1s. 10d. per lb.
Terpineol.—2s. 4d. per lb. Cheaper.
Vanillin.—26s. per lb.

Essential Oils

Almond Oil, Foreign S.P.A.—15s. 6d. per lb.
Anise Oil.—2s. 8d. per lb.
Bergamot Oil.—19s. 6d. per lb.
Bourbon Geranium Oil.—36s. 6d. per lb.
Camphor Oil.—75s. per cwt.
Cananga Oil, Java.—10s. 6d. per lb.
Cinnamon Oil, Leaf.—6½d. per oz.
Cassia Oil, 80/85%.—8s. 9d. per lb. Cheaper.
Citronella Oil.—Java, 85/90%, 5s. 8d. per lb. Cheaper. Ceylon, 3s. 7d. per lb.
Clove Oil.—7s. 6d. per lb. Firm.
Eucalyptus Oil, 70/75%.—2s. 1d. per lb. Price advanced on fair business.
Lavender Oil.—French 38/40% Esters, 30s. per lb. Very firm. Higher prices expected owing to bad crops.
Lemon Oil.—3s. per lb.
Lemongrass Oil.—3d. per oz.
Orange Oil, Sweet.—13s. per lb.
Otto of Rose Oil.—Bulgarian, 37s. 6d. per oz. Production below normal. Anatolian, 18s. per oz.
Palma Rosa Oil.—19s. per lb.
Peppermint Oil.—Wayne County, 21s. per lb. Firm spot and forward. Japanese, 14s. 3d. per lb.
Petitgrain Oil.—9s. 3d. per lb. Cheaper.
Sandal Wood Oil.—Mysore, 26s. 6d. per lb. Australian, 21s. per lb.

Scottish Chemical Market

The following notes on the Scottish Chemical Market are specially supplied to* THE CHEMICAL AGE *by Messrs. Charles Tennant and Co., Ltd., Glasgow, and may be accepted as representing the firm's independent and impartial opinions.

Glasgow, August 7, 1924.

THE past week has brought quite a considerable improvement in the Scottish Heavy Chemical Market, inquiries, particularly for export, being more plentiful than for some little time. Prices of most products, both of home and continental manufacture are generally firm.

Industrial Chemicals

ACID ACETIC.—Prices quoted last week well maintained. Glacial 98/100%, £58-£69 per ton; 80% pure, £45-£48; 80% technical £43 15s.-£45 per ton. All packed in casks c.i.f. U.K. ports, duty free.

ACID BORACIC.—Crystal or granulated, £45 per ton; powdered, £47 per ton, carriage paid U.K. stations, minimum ton lots.

ACID CARBOLIC, ICE CRYSTALS.—Unchanged at 6¾d. per lb., f.o.b. U.K. port.

ACID CITRIC, B.P. CRYSTALS.—Now on offer at 1s. 6d. per lb., less 5%, ex store, spot delivery. Offered for prompt shipment from the Continent at 1s. 5½d. per lb. less 5%, ex wharf.

ACID FORMIC, 85%.—Moderate inquiry and price unchanged at about £56 per ton, ex store, spot delivery. Offered from the continent at £54 10s. per ton, ex wharf, prompt shipment.

ACID HYDROCHLORIC.—In little demand. Price 6s. 6d. per carboy, ex works.

ACID NITRIC.—80°, £23 10s., per ton, ex station, full truck loads.

ACID OXALIC.—Spot lots quoted 4¼d. per lb., ex store, but could probably be bought at a shade less. Offered for prompt shipment from the continent at 3¾d. per lb., c.i.f., U.K. port.

ACID SULPHURIC.—144°, £3 12s. 6d. per ton; 168°, £7 per ton, ex works, full truck loads. Dearsenicated quality, 20s. per ton more.

ACID TARTARIC, B.P. CRYSTALS.—Offered for immediate delivery at 1s. 1½d. per lb., less 5 %, ex store. Quoted 1s. 1d. per lb., less 5%, ex wharf, prompt shipment from the continent.

ALUMINA SULPHATE.—17/18% iron free. Spot lots still available at £7 17s. 6d. per ton, ex store. Offered for early delivery from the continent at £7 5s. per ton, c.i.f., U.K. port.

ALUM CHROME.—Good inquiry for export. Quoted £19 10s.-£21 10s. per ton f.o.b. U.K. port. Potash chrome alum on offer at about £26 10s. per ton ex store; potash (lump) offered from the Continent at about £8 10s. per ton, c.i.f. U.K. port. Spot lots available at about £9 10s. per ton, ex store. English material quoted £9 7s. 6d. per ton, f.o.b. U.K. port for export.

AMMONIA ANHYDROUS.—Unchanged at about 1s. 6d. per lb. ex station. Containers extra and returnable.

AMMONIA CARBONATE.—Lump, £37 per ton; powdered, £39 per ton, packed in 5 cwt. casks, delivered U.K. port.

AMMONIA LIQUID, 880°.—In steady demand. Unchanged at 2½d. to 3d. per lb., delivered, according to quantity, containers extra.

AMMONIA MURIATE.—Grey galvanisers' quality quoted £30 per ton, ex station; fine white crystals of English manufacture now quoted £37 per ton, f.o.b. U.K. port for export. Offered from the continent at £24 15s. per ton.

ARSENIC, WHITE POWDERED.—Moderate inquiry for export. Quoted £52 10s. per ton, f.o.b. U.K. port. Spot lots on offer at £54 per ton, ex store.

BARIUM CARBONATE, 98/100%.—Slightly dearer quotations from the continent. Now quoted £11 15s. per ton, c.i.f., U.K. port.

BARIUM CHLORIDE.—Offered from the continent at £13 10s. per ton, c.i.f., U.K. port. Quoted £14 per ton, ex store, spot delivery.

BARYTES.—Finest English white quoted £5 5s. per ton, ex works; continental about £5 per ton, c.i.f. U.K. port.

BLEACHING POWDER.—Spot lots £11 per ton, ex station; contracts 20s. per ton less.

BORAX.—Granulated, £24 10s. per ton; crystals, £25 per ton; powdered, £26 per ton, carriage paid U.K. stations, minimum ton lots.

CALCIUM CHLORIDE.—English material unchanged at £5 12s. 6d. per ton, ex station. Now offered from the continent at £5 per ton, c.i.f. U.K. port.

COPPERAS, GREEN.—Unchanged at about £3 per ton, ex works, packed in casks free.

COPPER SULPHATE.—English material for export quoted £24 per ton, f.o.b. U.K. port. Spot lots of continental on offer at about £23 10. per ton, ex store.

FORMALDEHYDE, 40%.—Unchanged at £54 per ton, ex store, spot delivery. Offered for prompt shipment from America at £50 15s. per ton, c.i.f. U.K. port.

GLAUBER SALTS.—English material quoted £4 per ton, ex store or station; continental on offer at about £3 17s. 6d. per ton, ex store. Offered for early delivery at £3 10s. per ton, c.i.f. U.K. port.

LEAD, RED.—English manufacturers advise advance in price of £1 per ton, with consequent rises in quotations for imported material. Now quoted £39 per ton, ex store, spot delivery.

LEAD, WHITE.—Quoted £42 per ton, ex store; spot delivery for imported material.

LEAD, ACETATE.—Spot lots of fine crystals now available at £45 15s. per ton, ex store. Offered from the continent at £44 per ton, c.i.f. U.K. port.

MAGNESITE CALCINED.—Quoted £7 17s. 6d. per ton, ex station, prompt delivery. Dead burnt magnesite on offer at about £4 15s. per ton, ex station.

MAGNESIUM CHLORIDE.—Continental prices inclined to be higher. Now quoted £3 12s. 6d. per ton, c.i.f. U.K. port. Spot lots on offer at about £4 2s. 6d. per ton, ex store.

POTASH CAUSTIC, 88/92%.—Spot material quoted £29 5s. per ton ex store, offered from the continent at about £28 per ton c.i.f. U.K. port.

POTASSIUM BICHROMATE.—Quoted 5½d. per lb., delivered.

POTASSIUM CARBONATE, 96/98%.—Quoted £22 10s. per ton c.i.f. U.K. port. Prompt shipment from the continent. Spot lots on offer at about £25 per ton ex store.

POTASSIUM CHLORATE.—Unchanged at about 2¾d. per lb ex store.

POTASSIUM NITRATE (SALTPETRE).—Unchanged at about £29 per ton ex store, spot delivery. Rather cheaper quotations from the continent. Now quoted £26 per ton c.i.f. U.K. port.

POTASSIUM PERMANGANATE, B.P. CRYSTALS.—Spot lots quoted 8½d. per lb., ex store. Offered from the continent at about 7¾d. per lb. c.i.f. U.K. port.

POTASSIUM PRUSSIATE (YELLOW).—Still in little demand. Nominally 7½d. per lb. f.o.b. U.K. port, but could probably be obtained for less.

SODIUM CAUSTIC.—76/77%, £19 7s. 6d. per ton; 70/72%, £17 17s. 6d per ton; 60/62%, broken, £19 2s. 6d. per ton; 98/99%, powdered, £22 15s. per ton. All ex station spot delivery, contracts 20s. per ton less.

SODIUM ACETATE.—Spot lots unchanged at about £23 15s. per ton ex store. On offer from the continent at £22 10s. per ton c.i.f. U.K. port.

SODIUM BICARBONATE.—Refined recrystallised quality £10 10s. per ton, ex quay or station. M.W. quality, 30s. per ton less.

SODIUM BICHROMATE.—English material unchanged at 4¼d. per lb. delivered.

SODIUM CARBONATE.—Soda crystals, £5 to £5 5s. per ton ex quay or station. Alkali, 58%, £8 12s. 3d. per ton, ex quay or station.

SODIUM HYPOSULPHITE.—English material unchanged at about £10 per ton ex station. Continental on offer at about £8 7s. 6d. per ton, c.i.f. U.K. ports. Spot lots available at about £9 15s. per ton ex store. Pea crystals of English manufacture quoted £13 15s. per ton ex station.

SODIUM NITRATE.—Spot lots inclined to be scarce. Ordinary quality quoted £13 10s. per ton ex store. 96/98% refined quality 7s. 6d. per ton extra.

SODIUM NITRITE, 100%.—Quoted £26 5s. per ton, ex store, spot delivery.

SODIUM PRUSSIATE (YELLOW).—In little demand. Quoted 4¼d. per lb., ex station or f.o.b. U.K. port.

SODIUM SULPHATE (SALTCAKE).—Price for home consumption, £3 10s. per ton, carriage paid, buyer's station. Good inquiry for export and price about £3 per ton f.o.b. U.K. port.

SODIUM SULPHIDE.—60/65%, solid, of English manufacture, £14 15s. per ton, ex station; broken, £1 per ton more; flake, £2 per ton more; 60/62%, solid, offered from the continent at £12 per ton c.i.f. U.K. port; broken, £1 per ton more; 31/34%, crystals of English manufacture, £9 2s. 6d. per ton ex station; 30/32%, crystals, offered from the continent at £8 7s. 6d. per ton c.i.f. U.K. port.

SULPHUR.—Flowers, £9 10s. per ton; roll, £8 10s.; rock, £8 7s. 6d.; ground, £8 5s.; ex store. Prices nominal.

ZINC CHLORIDE.—98/100%, solid, offered from the continent at £24 15s. per ton c.i.f. U.K. port; English material quoted £27 10s. per ton f.o.b. U.K. port.

ZINC SULPHATE.—English material on offer at £13 5s. per ton ex station; continental quoted at about £11 5s. per ton c.i.f. U.K. port.

NOTE.—The above prices are for bulk business and are not to be taken as applicable to small parcels.

Coal Tar Intermediates and Wood Distillation Products

ALPHA NAPHTHYLAMINE.—Large export inquiries. Price 1s. 4d. per lb. f.o.b.

BETA NAPHTHOL.—Several home inquiries. Price remains firm at 1s. 1d. per lb.

DIANISIDINE BASE.—Some export inquiry. Price 22s. 6d. lb., 100% basis, f.o.b.

DIAMIDO STILBENE DISULPHONIC ACID.—Some export inquiry. Price 7s. 3d. lb., 100% basis, f.o.b.

H ACID.—Some home inquiry. Price 4s. 2d. lb., 100% basis, carriage paid.

META NITRANILINE.—Good home and export inquiries. Price 4s. 9d. per lb. delivered or f.o.b.

PARANITRANILINE.—Some home inquiry. Price 2s. 3½d. lb. delivered.

PARA NITRO TOLUOL.—Some home inquiry. Price 2s. lb. delivered.

The Manchester Chemical Market

[FROM OUR OWN CORRESPONDENT.]

Manchester, August 7, 1924.

THE August break has affected the volume of business in chemicals this week. Generally the position is about the same as at last report, buyers confining themselves largely to spot or near delivery transactions, principally small parcels, business for forward delivery being very quiet. The export demand is still chiefly on Colonial account and for the most part for the bread and butter lines of "heavies." Continental demand is still very slow. Quotations are not much changed from last week, but there is still a certain amount of weakness in some cases.

Heavy Chemicals

Little business is being done in hyposulphite of soda, although values are fairly steady; photographic crystals are offering at £14 5s. per ton and commercial at round £9 15s. Prussiate of soda is also inactive, and quotations have an easy tendency, to-day's value being about 4d. per lb. Salt-cake is quiet both for home and export, prices ranging from £3 5s. to £3 10s. per ton. Caustic soda still meets with a moderately active inquiry from domestic users and for shipment; 60 per cent. material is quoted at £16 17s. 6d. per ton and 76–77 per cent. at £19 7s. 6d. Sodium sulphide is selling only in small quantities, and values are easy at round £14 per ton for 60–65 per cent. concentrated solid and £9 10s. for crystals. Chlorate of soda is steadier and in moderate inquiry at 2½d. to 2¾d. per lb. Glauber salts are unchanged in position or value at £3 10s. per ton. Bleaching powder is still offering at £10 per ton, but the demand for this material is rather quiet. Alkali is steady and in fair demand at £6 15s. per ton. Phosphate of soda is inactive, but values continue at last wek's level of £13 10s. per ton. Bichromate of soda is in moderate inquiry at 4½d. per lb. Acetate of soda has only a slow sale, and quotations are easy at £23 to £23 10s. per ton. Soda crystals are rather quiet, but current values are unchanged at £5 5s. per ton. Bicarbonate of soda is steady at £10 10s. per ton, but the demand is restricted.

Caustic potash is rather weaker at £28 10s. per ton for 90 per cent. strength, only a limited amount of business being done. Carbonate of potash is in much the same position, value being round £22 10s. per ton. Permanganate of potash is steady and in moderate inquiry at 7d. to 7¾d. per lb., according to quality. Yellow prussiate of potash is still an inactive section of the market, but values, though still weak, are no lower than last week at 7d. to 7¼d. per lb. Chlorate of potash meets with a quiet demand, with prices steadier at 2¾d. per lb. Bichromate of potash is only a moderate inquiry at 5½d. per lb.

Buying interest in arsenic shows no improvement, but no further weakness of price has developed, white powdered Cornish makes, offering at round £48 per ton in Manchester. Sulphate of copper is about unchanged at £24 5s. to £24 10s. per ton, f.o.b.; the demand for this material is still on a small scale. Commercial Epsom salts are maintained at round £4 15s. per ton, a fair volume of business being done; magnesium sulphate, B.P. quality, is quoted at £6 10s. per ton. Nitrate of lead is quiet at about £42 per ton. Grey acetate of lime arouses little buying interest, though prices are still round £18 per ton; brown material is quoted at about £12 10s.. White acetate of lead keeps quiet at £46 to £47 per ton, brown offering at £45.

Acids and Tar Products

Tartaric and citric acids are quieter than they have been, and values are easier; tartaric is now offering at about 1s. 1d., and citric 1s. 5d. to 1s. 5½d. per lb. Oxalic acid continues dull at about 4¼ per lb. Acetic acid is also selling less freely, and 80 per cent. technical is now quoted down to £43 per ton, with glacial at about £68.

The coal-tar products are moving very slowly, and in some cases prices are distinctly weak. Carbolic acid is a very poor market; crystal is offering at 6¼d. to 6½d. per lb. and crude at 1s. 9d. to 2s. per gallon. Pitch is more or less nominal at £3 per ton, with inquiry still coming forward for export at the opening of the shipping season. Creosote oil is quoted at round 6d. per gallon. Naphthalenes are dull at £16 10s. per ton for refined and £5 and upwards for crude, according to quality. Solvent naphtha is inactive at round 1s. 4d. per gallon.

Company News

BENN BROTHERS, LTD.—The accounts for the year to June 30 last show a net profit of £28,065, to which must be added the balance brought forward from last year of £10,133, making a total sum available of £38,198. The directors have allocated £10,000 to the Development Fund, and recommend a dividend of 17½ per cent., the same as last year, leaving £11,165 to be carried forward.

CENTRIFUGAL SEPARATORS, LTD.—The accounts for the year to March 31 last show a loss of £3,516, increasing the debit-balance carried forward to £23,711.

ENGLISH VELVET AND CORD DYERS' ASSOCIATION.—The directors have declared an interim dividend at the rate of 6 per cent. per annum on the ordinary shares.

W. AND H. M. GOULDING, LTD.—The net profit for the year to June 30 last, including dividends from subsidiary companies and sum transferred from excess profits duty account, and after setting aside £7,000 to cover estimated discounts on realisation of outstanding debts, were £35,601, including £3,903 brought forward. The directors recommend a dividend of 5 per cent. on the ordinary shares, placing £5,000 to depreciation account, leaving £3,476 to be carried.

New Chemical Trade Marks

Applications for Registration

[*This list has been specially compiled for us by Mr. H. T. P. Gee, Patent and Trade Marks Agent, 51 and 52, Chancery Lane, London, W.C.2, from whom further information may be obtained. Opposition to the Registration of the following Trade Marks can be lodged up to August 30, 1924.*]

"COBRATCHO."

448,764. For chemical substances used in manufactures, photography or philosophical research and anti-corrosives. Blyth and Platt, Ltd., Solar Works, Greatham Road, Watford, Hertfordshire, polish manufacturers. May 28, 1924. (To be Associated. Sect. 24.)

"ARMOURITE."

449,305. For chemical substances used in manufactures, photography or philosophical research and anti-corrosives. Griffiths Bros. and Co. (London), Ltd., 29, Macks Road, Bermondsey, London, S.E.16, paint, colour and varnish manufacturers. June 17, 1924. (To be Associated. Sect. 24.)

"CASTROMUL."

448,387. For chemical substances prepared for use in medicine and pharmacy, Milan Francis Pratt, 154, East Avenue, Rochester, New York, United States of America, manufacturing chemist. May 14, 1924.

"ARMOURITE."

449,306. For raw or partly prepared vegetable, animal and mineral substances used in manufactures, not included in other classes. Griffiths Bros. and Co. (London), Ltd., 29. Macks Road, Bermondsey, London, S.E.16, paint, colour and varnish manufacturers. June 17, 1924. (To be Associated' Sect. 24.)

CADAL

448,093. For dyes included in Class I, and chemical substances included in Class I, for removing dyes and grease from textile fabrics in course of manufacture. H. C. Mahillon Blom and Cie, 15, Rue des Denrees (Colonne du Congres), Brussels, Belgium, manufacturers. May 5, 1924.

Commercial Intelligence

The following are taken from printed reports, but we cannot be responsible for any errors that may occur.

County Court Judgments

[NOTE.—The publication of extracts from the "Registry of County Court Judgments" does not imply inability to pay on the part of the persons named. Many of the judgments may have been settled between the parties or paid. Registered judgments are not necessarily for debts. They may be for damages or otherwise, and the result of bona-fide contested actions. But the Registry makes no distinction of the cases. Judgments are not returned to the Registry if satisfied in the Court books within twenty-one days. When a debtor has made arrangements with his creditors we do not report subsequent County Court judgments against him.]

STANSFIELD, T. A., 14, Broom Lane, Levenshulme, Manchester, manufacturing chemist. (C.C., 9/8/24.) £21 9s. 6d. June 27.

VAPURO, LTD., 127, Gray's Inn Road, W.C., manufacturing chemists. (C.C., 9/8/24.) £18 5s. April 14.

Bill of Sale

MOTTERSHEAD, Thomas Henry, 82, Tootal Drive, Weaste, chemical merchant. (B.S., 9/8/24.) July 31. £50.

Deed of Arrangement

ROBINSON, Roger Marlow and ROBINSON, Isabella (his wife), trading as FARINOL CO., 5A, Wilson Street, Stockport, and residing at The Gables, Mottram Road, Stalybridge, gum manufacturers. (D.A., 9/8/24.) Filed July 26. Trustee: A. J. Phelan, 37, Cross Street, Manchester, C.A. Secured creditors, £5,807; liabilities unsecured, £4,916; assets, less secured claims, £3,307.

Mortgages and Charges

*[NOTE.—The Companies Consolidation Act of 1908 provides that every Mortgage or Charge, as described therein, shall be registered within 21 days after its creation, otherwise it shall be void against the liquidator and any creditor. The Act also provides that every Company shall, in making its Annual Summary, specify the total amount of debts due from the Company in respect of all Mortgages or Charges. The following Mortgages and Charges have been so registered. In each case the total debt, as specified in the last available Annual Summary, is also given—marked with an *—followed by the date of the Summary, but such total may have been reduced.]*

KEY PRODUCTS, LTD., London, E.C., chemical manufacturers. (M., 9/8/24.) Registered July 17, £150 debentures balance of amount registered February 13, 1924; general charge; also registered July 17, £150 second debentures (filed under Sec. 93 (3) of the Companies (Consolidation) Act 1908); present issue £50; general charge.

STODDART AND JAMES, LTD., Bristol, ink manufacturers. (M., 9/8/24.) Registered July 24, £4,000 mortage, to A. F. Stoddart, Grafton Lodge, Stoke Bishop, Bristol, ink manufacturer; charged on 16 to 25 Hepburn Road, Bristol, with machinery, etc. *Nil. September 11, 1923.

London Gazette

Companies Winding Up Voluntarily

ELECTROMET SOAP CO., LTD. (C.W.U.V., 9/8/24.) W. P. Masterson, Bank of England Chambers, Tib Lane, Manchester, chartered accountant, appointed liquidator. Meeting of creditors at the liquidator's offices on Wednesday, August 13, at 11 a.m.; creditors' claims by September 12.

OZONIZED OXYGEN CO., LTD. (C.W.U.V., 9/8/24.) K. S. Morrison, of W. B. Peat and Co., chartered accountants, Leeds, appointed liquidator.

Order made on Application for Discharge

CURTIS, William Henry, Atlas Chemical Works, New Mills, in the county of Derby, trading as W. H. CURTIS AND CO., manufacturing chemists. (O.M.A.D., 9/8/24.) Date of order, June 24. Discharge suspended for two years.

Receiverships

PHŒNIX CHEMICAL CO., LTD. (R., 9/8/24.) V. Walker, of Lloyds Bank Buildings, King Street, Manchester, was appointed receiver and manager on July 16, 1924, under powers contained in mortgage dated July 2, 1919.

PREMIER BRIQUETTE CO., LTD. (R., 9/8/24.) W. W. Macalister, of 80, Coleman Street, E.C., was appointed receiver on July 16, 1924, in place of W. C. Todd, whose appointment was terminated on that date, under powers contained in debentures issued on September 1 and 25, 1922.

WARD (LEOPOLD), LTD. (R., 9/8/24.) C. M. Duncan, of Duncan, Allwork and Co., chartered accountants, 399, Salisbury House, London Wall, E.C.2, has been appointed receiver and manager on behalf of the debenture holders.

New Companies Registered

BUCKNALL CHEMICAL PRODUCTS, LTD. To acquire certain patents for inventions relating to the manufacture of paints, enamels, japans and the like, and to the extraction of iron and of titanium compounds from titanium ores. Nominal capital, £6,000 in £1 shares. Solicitors: Redden and Booth, 17, Victoria Street, London, S.W.1.

DURSLEY COAL PRODUCTS, LTD., Long Street, Dursley, Glos. To adopt an agreement between the Low Temperature Carbonisation Co., Ltd., and G. C. W. Dow, to buy, sell, prepare for market and deal in coal, coke, smokeless and other fuels; gasworkers, distillers, coke and chemical manufacturers, etc. Nominal capital, £1,000 in £1 shares.

H. T. EVANS AND CO., LTD., 25, Lord Street, Liverpool. Metallurgists, manufacturers and mine owners. Nominal capital, £5,000 in £1 shares.

R. E. GRUNDY AND CO. (1924), LTD., Crow Oaks Works, Whitefield, near Manchester. Manufacturing chemists. Nominal capital, £1,000 in £1 shares.

RUBBER TAR, LTD., Huntershill, Bishopbriggs, Lanarkshire. Manufacturers of and dealers in chemicals and chemical products, tar and ammonia, distillers and manufacturers of disinfectants and soap, etc. Nominal capital, £21,000 in 10,095 7 per cent. "A" preference shares, and 4,000 6 per cent. "B" preference shares of £1 each, and 38,100 ordinary shares of 1s. each, and 5,000 6 per cent. "C" preference shares of £1.

Chemical Trade Inquiries

The following inquiries, abstracted from the "Board of Trade Journal," have been received at the Department of Overseas Trade (Development and Intelligence), 35, Old Queen Street, London, S.W.1. British firms may obtain the names and addresses of the inquirers by applying to the Department (quoting the reference number and country), except where otherwise stated.

CHEMICAL PRODUCTS FOR ITALY.—A firm at Milan desires to obtain exclusive agencies of British manufacturers of artificial silk and chemical products (principally those connected with the textile industry). (This is a repetition of a notice which appeared in the *Journal* of June 25.) (Reference No. 171.)

CHEMICALS FOR SPAIN.—A commission agent at Barcelona wishes to secure the representation of British exporters of sulphate of ammonia, sodium bichromate, potassium bichromate, dinitrocloro-benzol, aniline oil. (Reference No. 176.)

MARKET FOR FIRE FIGHTING APPLIANCES.—A confidential memorandum on the market for fire fighting appliances in South China has been received by the D.O.T., and issued to firms whose names are entered upon its Special Register. British firms desirous of receiving a copy should communicate with the D.O.T. (Reference No. A.X./1,202.)

AGENTS' SERVICES OFFERED.—A firm established in Valparaiso desires to obtain agencies for chemical ingredients for tanners, soap-making and for candle factories. (Reference No. 183.)

Trade Development in India

To interest intelligent Punjabees in technical, industrial and commercial matters a Business Library is being formed at Lahore, to which British manufacturers are being invited to submit catalogues, circulars, samples, etc., which will be exhibited in the reading room without charge. These may be sent to the Hon. Secretary, Sir Ganga Ram, Business Bureau and Library, Saleem Buildings, Maclagan Road, Lahore, Punjab, India.